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WORLD MARITIME UNIVERSITY

Malmö, Sweden

**ANALYZING, EVALUATING AND IMPROVING
THE LOGISTICS PERFORMANCE INDEX (LPI)
OF A COUNTRY'S ECONOMY. CASE STUDY:
NIGERIA, GHANA AND MOROCCO.**

By

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A dissertation submitted to the World Maritime University in partial

Fulfilment of the requirement for the award of the degree of

MASTER OF SCIENCE

In

MARITIME AFFAIRS

(SHIPPING MANAGEMENT AND LOGISTICS)

2019

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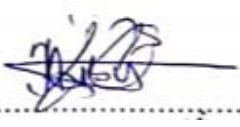
DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature) 

(Date) 24th September 2019

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We also thank all our interview respondents for taking time out to provide us with their vital insights for our research. We appreciate our numerous family and friends for their understanding during this time of intense study.

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ABSTRACT

Title: **Analyzing, Evaluating and Improving the Logistics Performance Index of a Country's Economy. Case Study: Nigeria, Ghana and Morocco.**

Degree: **Master of Science**

Globalization has prompted an expanded requirement for universal transportation of products and along these lines worldwide logistics. To ascertain the performance of nations with respect to logistics the “Logistics Performance Index (LPI)” was made in 2007. The LPI uses scores on six core segments to ascertain overall logistics performance, while positioning nations in like manner. These parts are altogether rated of the same significance when the general score is determined, which seems to be impossible in the complex arrangement of logistics.

This study attributes weights to the six segments utilizing the scores from the experts and this was solved as a multi-criteria analysis utilizing the “Technique for Order Preference by Similarity to Ideal Solution (TOPSIS)”.

Ten respondents replied to a survey and found various weight scores. The infrastructure is viewed as the most significant component in logistics performance with a rating of 0.24 with tracking and tracing as the least significant at 0.10. The weights are fundamentally not the same as the mean assumed for the World Bank LPI. This study includes Africa (especially, Nigeria, Ghana and Morocco) and other developing areas of the world, since it is apparently the first attempt to assign weights in logistics performance estimations and nations can utilize these loads to enhance logistics more effectively.

The hypotheses tested in the study were all true and accepted. From the comparative analysis conducted by TOPSIS, the country with the best logistics performance considering the six components of LPI is Morocco, which scored 0.561, followed by Ghana, with a value of 0.496. Nigeria scored the least with a score of 0.457.

In this analysis, great importance was placed more on the infrastructure, followed by the services of the experts. Factors like timeliness have the least importance, and therefore the lowest weight assigned. Suggestions to further improve the logistics performances of these countries, both in on a near and long term basis, have been given. New components of the logistics performance have also been recommended to the ‘World Bank’.

KEYWORDS: ‘Logistics Performance Index (LPI)’, ‘Logistics Performance’, TOPSIS Method, Weighting, Weighted LPI.

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CHAPTER ONE

INTRODUCTION

This section provides a short outline of the Logistics Performance Index (LPI) principles of the World Bank and the different ideas joined to it, to empower a superior comprehension of this work. It also provides a report that with a detailed clarification of the Logistics Performance Index (LPI) and along these lines, analyses will be done. This chapter also provides the motivation for the chosen research questions, the research methodology and lastly, explains the overall structure of this paper.

1.1 Background of the Study

Jonsson et al (2005), explains “Logistics as the careful planning, organizing, and controlling of all necessary activities in the material flow, beginning from the raw material up until the final consumption and reverse flows of the manufactured product, with the aim of satisfying the customer’s needs and wishes.”

After some time, it is common information that logistics coordination is that significant bit of the system of production that makes arrangements, plans, executes and controls the compelling movement of product and endeavors from the point of commencement to the point of use or utilization in order to meet the essential need set by the customer. Activities encompassing logistics management ordinarily incorporate inward and outward transportation management, fleet coordination, materials harnessing, request satisfaction, network configuration, stock administration, supply/demand arranging and the management of suppliers. It further incorporates sourcing and acquirement creation arranging and scheduling bundling and gathering. “Logistics management is an incorporating capacity which cautiously assembles and advances all logistics exercises with different capacities including advertising deals assembling account and data innovation.” (Logistics Management, council of Supply Chain Management Professionals CSCMP, 2004).

Logistics in its traditional definition is dealing with the progression of products data and

accounts from the source providers to the last shopper clients. It additionally requires a procedure for dealing with the progression of merchandise data and funds from the benefactors to the influenced people.

The World Bank gives several pointers to watch logistics performance given the pertinence of the supply network's performance on a nation's development level. These pointers help public decision variables, in assessing the effectiveness of local supply chains, and furthermore the contrast between national supply chains and other supply chains. Another marker, which demonstrates the importance of these arrangements is the logistics gap. The field battles a progression of difficulties going from ecological difficulties, spatial arranging and service administration. The supply chains' performance is a source of upper hand, settling on all pertinent decisions, business variables' and partners' interventions (Arvis et. al., 2014).

The World Bank's Logistics Performance Index (LPI) gives expansive appraisal apparatus to ascertain the exchange and transport improvement agreeableness of countries. Understanding and disintegrating the components of exchange and Logistics execution can enable nations to improve cargo transport productivity and distinguish where worldwide collaboration could help beat boundaries. Globally, Arvis et. al. (2014), consider supply chains to be the essential piece of world trade and exchange. The Logistics of these chains has the associated parts: stock transport, warehousing, traditions activities, installment frameworks, and the tasks externalized by makers and merchants. We unswerving realize that a proficient performing calculated is of indispensable significance for monetary development, for expansion and for destitution decrease.

Hence, logistics has happened to veritable open enthusiasm, for governments, territorial and worldwide organizations, albeit still predominantly done by private administrators. As the International Transport Workers' Foundation (ITF) puts it, 'Logistics execution is a solid determinant of national salary and policy creators are keen on Logistics execution markers as a result of the potential for improved transport administrations to advance

monetary advancement. The World Bank's Logistics Performance Index, for instance, is routinely referred to by Ministers. Key execution markers are all things considered open to misconception and abuse in this segment as much as any other (ITF, 2016). Logistics is an unpredictable succession of facilitated exercises. The execution of logistics relies upon open elements - governments – for framework, Logistic administrations, and the help of cross fringe business (Arvis et. al., 2014). Being of global pertinence, the field of logistics and transport demonstrates its significance likewise in an African dimension.

Proficient logistics administrations encourage the portability of items, guaranteeing their well-being and speed just as decrease in cost when exchanging them among nations. De Souza et al. (2007) “characterizes logistics as a major aspect of the value chain which plans, actualizes and controls the proficient progression of products, administrations and data from source to consumer.” Eventually, the significance of logistics lies in the capacity to proficiently explain transportation, stockpiling and bundling issues, expanding the aggressiveness of organizations and the nation when all is said and done.

The LPI depends on an overall review of administrators on the ground (worldwide cargo forwarders and express bearers), giving criticism on the logistics "cordiality" of the nations in which they work and those with which they exchange commodities. They consolidate inside and out the information of the nations in which they work with educated subjective evaluations regarding different nations where they exchange and experience of worldwide logistics condition. Criticism from administrators is enhanced with quantitative information on the execution of key parts of the logistics chain in the nation of work. The LPI comprises subsequently of both subjective and quantitative measures and helps manufacture profiles of logistics a kind disposition for these nations. It quantifies the execution along the Logistics supply network inside a nation and offers two alternate points of view: universal and household. The execution score is from 0 to 100. The most noteworthy score mirrors the best circumstance.

The Logistics Performance Index (LPI) examining differentiates among countries to the

extent of customs, procedures, logistic expenses and the idea of the establishment for land and ocean transport. An examination of trade help measures can be moved closer through the Logistics Performance Index (LPI) as circulated by the World Bank in 2007, 2010, 2012, 2014, 2016 and 2018 for an aggregate of one hundred and sixty countries. This record enables the contrasts between nations to be broken down, giving a diagram of traditions methodology, logistic costs and the nature of the framework vital for land and sea transport.

Progressively regarded by policymakers, utilization of the LPI has altogether improved the discourse among policymakers and the private part as they decide needs in exchange and transportation assistance. Be that as it may, making exchange logistics work for intensity at the nation or sub-local dimension requires something other than bringing issues to light. A top to bottom multidimensional appraisal of the exchange and transport execution identified with the activity plans and strategies, for example, changes in national guidelines and expenses or framework interests in explicit connections, hubs and passages requires a wide range of diagnostic methodologies. The LPI, utilized related to other in-house assets, could incite discourse on components that drive Logistics execution and those territories where boundaries thwart execution.

The LPI is a multidimensional appraisal device for estimating productivity and dependability of store network structures in national and worldwide exchange limits (Arvis et al., 2007). Created by the World Bank, scholastics and logistics specialist co-ops, the LPI reviews logistics experts, little and medium size cargo forwarders, and worldwide express transporters working in their very own nations, it was designed to distinguish the difficulties and chances of exchange efficiencies (Arvis et al., 2007). Since 2007, the LPI has been utilized to assess store network efficiencies in excess of 150 nations reviewing more than 1000 experts in the nations they work (Arvis et al., 2007). The LPI is organized along global and residential limits utilizing quantitative benchmark to rank "logistics cordiality" of taking an interest nation (Arvis, Mustra, Ojala, Shepherd, and Saslavsky,

2010).

A multi-dimensional appraisal of Logistic execution, the LPI of the World Bank, is a worldwide bench-marking apparatus concentrating explicitly on estimating the exchange and transport assistance friendliness of a specific nation, and in this manner, pushing them to distinguish key hindrances to, and open doors for, development.

The LPI condenses the performance of nations through six measurements that catch the most significant parts of the Logistics condition:

- Customs; productivity of the tradition's freedom process
- Infrastructure; nature of exchange and transport-related infrastructure
- International Shipments; simplicity of masterminding aggressively evaluated shipments
- Logistics Quality; ability and nature of Logistics administrations
- Tracking and Tracing; robustness to "track" and follow transfers
- Timeliness; recurrence with which shipments achieve the representative inside the planned or anticipated time (Arvis, et al. 2014)

1.2 Problem Discussion

Trade between countries has developed over the past decades. In the previous years, most nations were rivaling different nations in their district, while globalization has expanded the measure of contenders to practically every one of the nations in the world. These advancements have expanded the significance of logistics in worldwide trade and turned it to one of the key components in the improvement of a nation (Puertas & Garcia, 2014). Erkan (2014) summarizes logistics exercises after some time up to 2700 B.C. at the point when the pyramids were manufactured. Different improvements in logistics are the primary paddling ships fit for crossing huge oceans, the development of railroads, and the creation of the 'sea container'. There have been talks about the precise meaning of logistics and a wide range of definitions have been proposed after some time by associations, 'journal articles', and organizations.

The initial references where the word logistics was utilized are from 1898 military applications and had to do with the development and quartering of soldiers and in a later article the procedure of loading stores (Lummus, Krumwiede and Vokurka, 2001). A later definition that covers the essential ideas of logistics was given by Souza, Goh, Gupto, and Lei (2007) "Logistics is that piece of the supply network process that plans, executes, and controls the proficient, quality flow and storage of merchandise, services, and related data from the point of origin to the point of utilization so as to meet clients' prerequisites".

Considerable research has been done to ascertain the job of logistics in organizations, supply chains, and around the world. Lambert and Stock (1993) investigated the activity of logistics in firms and the effects on the economy. They summarized that logistics is one of the most noteworthy fields of study that can enhance a country's standard of life. Razzaque (1997) portrays that improving the logistics of a nation positively affects profitability, dissemination proficiency, interest rates, and trade volumes. Hoekman and Nicita (2011) stated the significance of logistics in third world nations. They examined various guidelines planned for expanding trade volumes. They reasoned that improving

logistics in a developing nation is more viable than broadly utilized confinement guidelines, for example, trade obstructions and tariff regulations. The numerous investigations into logistics have expanded the mindfulness that improving the logistics arrangement of a nation can have huge positive outcomes for the economy. Accordingly, numerous logistics related activities have been proposed and actualized by governments and organizations around the world. The expanded consciousness of the significance of logistics has additionally prompted the need to analyze and evaluate logistics processes in Africa. Some of which are the challenges militating against their effective performance in the international market and also discover ways by which their current abilities can be optimized in order for African countries to effectively compete with other regions in the international market.

1.3 Purpose of the Study

The world is gradually evolving into a global economy and Africa plays an increasing role both as a supplier of commodities and as a consumer market for products from other different parts of the world. Thus, it is vital to understand logistics performance practices in Africa.

The purpose of this research work, thus, is to examine the current state of Logistics Performance in Africa (Using Nigeria, Ghana & Morocco as Case Study) and identify the challenges and opportunities inherent in the system while also discovering ways by which the challenges can be overcome and the opportunities fully maximized. The research work further aims to carry out a comparative analysis of the logistics performance of the selected countries.

The specific objectives of the study are:

1. Evaluate 'Logistics performance of African' nations (utilizing Nigeria, Morocco and Ghana as contextual analysis) in view of LPI segments.

2. Carry out a comparative analysis of “Logistics Performance Index” of the selected countries (Nigeria, Morocco and Ghana)
3. Discuss the relationships between the “Liner Shipping Connectivity Index produced by UNCTAD & World Bank Logistics Performance Index”.

1.4 Research Questions

With respect to the objectives of this work, the accompanying research questions have been established to direct the investigation in meaningful direction:

1. What is the implication of each of the 6 parameters on the country’s import and export?
2. What is the performance of Africa (Ghana, Nigeria and Morocco) under LPI components? (SQ1)
3. What is the impact of “trade logistics performance” on ‘export’ and ‘import’? (SQ2)

The main research question relates to stating a basis to begin the research, thereby presenting a necessary guide as to what is needed to be covered and what is not needed as the analysis is being made. This will be answered by carefully digging into the archives of the LPI as regards to Africa. The sub question is aimed at providing answers to the consequences of either the decline in performances or improvement in performances of the LPI overtime. All questions, both main and sub-question, will be answered by data collected from interviews and complementary secondary data.

1.5 Delimitation

The key focus of this work is analyzing and improving the LPI of a countries' economy, countries 'logistics performance' on international trade as measured by the Logistics Performance Index and trade logistics cost.

1.6 Methodology

This study analyzes the relationship between logistics performance indicator and its components namely customs, infrastructure, international shipments, logistics quality and competence, tracking and tracing and finally, timeliness and exports in three African countries (Nigeria, Ghana and Morocco). It entails the trend and comparative analysis of quantitative and qualitative data. Giving insights about this relationship will help increase the competitiveness of a country.

In this study, secondary data is collected from the official World Bank data base and Liner Shipping Connectivity Index produced by UNCTAD, while primary data is obtained from the questionnaire responses. Both "primary and secondary" data will give the fundamental contribution to a multi-criteria analysis model that would be created in this investigation utilizing the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS).

This model will, with no type of predisposition dissect, assess and propose feasible approaches to improve the Logistics Performance Index (LPI) of Nigeria, Ghana and Morocco as per the six criteria ("customs, infrastructure, ease of arranging shipments, quality of logistics services, tracking and tracing and timeliness"). The questionnaires comprise LPI score ranges between 1 (lowest) and 5 (highest) that is applied for the overall score and its six components. In the questionnaire, a space is provided for the experts to assign weights to each of the six criteria and also to suggest if there are new criteria ought to be considered when analyzing LPI of countries, which are currently not being accounted for or considered by the World Bank.

The weighting by the experts against each of the criteria will influence our decision on whether the equal weighting across the criteria by World Bank is justified or not. For the multi-criteria decision model, an average of the weight by the experts. The Logistics Performance Index by World Bank and Liner Shipping Connectivity Index by UNCTAD will be compared to see how their index rating vary for the three countries considered in this study. Finally, statistical analysis (using Excel Data Analysis Toolpak) will be made to ascertain the hypotheses validity and find the dependency.

1.7 Disposition

The first chapter introduces the given discussion and usher us into the basics by addressing the relevance of the conducted research. Chapter two contains an overview of relevant literature review. Clarifications on how the examination is led, just as the conceptual structure of the investigation, will be displayed in chapter three. The data gathering and "methodology" are laid out in chapter four. The 'quantification' of factors is introduced in chapter five. The discoveries of the analysis are outlined in chapter six. The next chapter highlights discussions related to the study. The last chapter provides the answers to the chosen research questions and also addresses the weaknesses of the research.

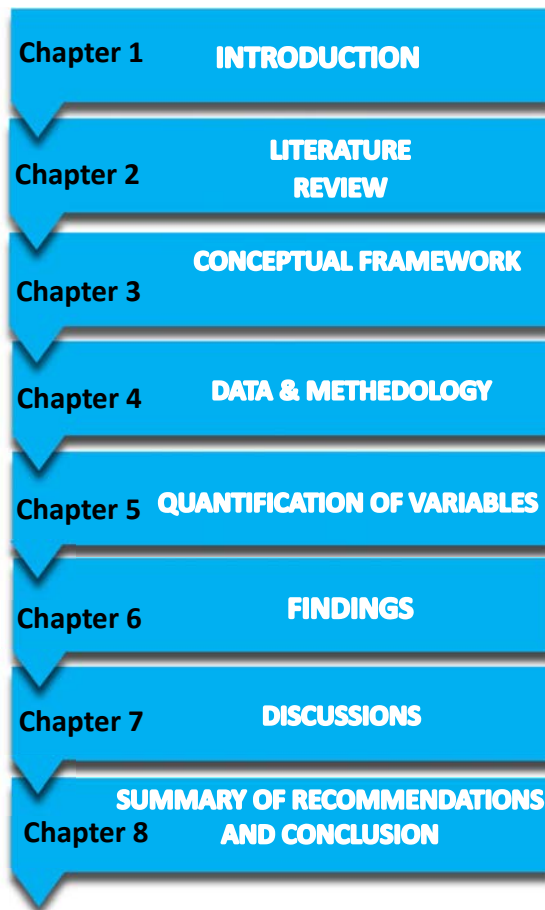


Figure i Chapter Overview

CHAPTER TWO

LITERATURE REVIEW

In this section, a review of the accessible and relevant past works for this study is done. It starts with a review of logistics performance and its contribution to the growth of the three nations. The chapter also reviews the current LPI components and their link to logistics performance and finally the summary of the literature review and knowledge gaps are presented.

International trade could be a channel of integrating countries' economies across regions. Africa's export to the world market is dominated by primary products in raw materials type i.e., fuel and natural product account for simple fraction of Africa's export. With regards to commercialism partners, Europe remains African export main destination and Asian countries (mainly China) square measure as second largest commercialism partners for African countries. The share of African export within the world market has reduced over the last couple of decades. The share has reduced from 4.9 % within the 1970s to 3.3 % in 2013 (United Nations Economic Commission for continent 2015). What square measures are the most reasons for declining African merchandise export share within the world market? The subsequent section has investigated African export expertise within the past and today.

2.1 Global Market in Africa: Contribution of the LPIs of Ghana, Nigeria and Morocco to its growth

In the examination performed by Mohan in 2013, it was demonstrated that the logistics management has immense impact on worldwide competitiveness. The paper additionally analyzed the notable highlights of Indian logistics frameworks on how the logistics specialist ought to cut down the logistics cost to customers, while simultaneously improving the administration standard (Mohan, 2013).

Sandberg and Abrahamson in their work investigated how to create the economical upper hand in the universal market using logistics as a source of upper hand. The exploration

explains the connection among operational and dynamic logistics capacities and the economical upper hand. The investigation recognized the five powerful abilities, to be specific "managerial knowledge and presence, cross-functional teamwork, control, learning and supply chain relationships". These all are crucial for the persistent improvement of the logistics process (Sandberg & Abrahamson, 2011).

J. Tongzon looks at the determinants of powerful logistics performance, and distinguished the key factors that are required for an effective logistics center point. The clients of logistics administrations do give more consideration to activity proficiency when choosing the administrations. Logistics administrators in the service sector, ought to do well to comprehend the necessities of their clients and attempt endeavors to meet and perhaps surpass their desires (Tongzon, 2004).

R. Founou built up a system for examining the commitment of Information Technology (IT) in the logistics segment. The paper presumed that IT would add to 'competitiveness' in restricted cases and that frequently the vital need speculation would apply. The paper recommends a double way to deal with data innovation vital administration: first, the firm ought to build up the ability to proficiently execute some standard arrangements on an open door based methodology; second, it should put its IT framework in the association with a solid top administration duty and an unmistakable vital arrangement (Founou, 2002).

Musta (2011) additionally proposes logistics to be one of the fundamental components of aggressiveness on a national scale. The quality logistics administrations and the infrastructures have a solid impact over the assistance of products between at least two nations. Against this background, wasteful logistics prompts a climb in costs, this is as far as time and cash, colossally influencing nations and the organizations, or diminishing the income produced as exhibited by Hausman et al. (2005). The "Organization for Economic Co-operation and Development OECD" (2005) states that strategic expenses can extend

somewhere in the range of 2% and 15% of the all-out turnover. So, logistics is a major decider in the international market competition.

2.2 Trade Logistics Performance in Africa

As characterized by the “Council of Logistics Management” in its 1998 definition, Logistics is a piece of ‘Supply Chain Management’, saddled with the responsibility of administration of the productive progressions of merchandise, administration and related data from the purpose of inception to the point of utilization with point of fulfilling clients' prerequisites. Logistics management is in charge of planning and enhancing logistics exercises, for example, transport management, materials handling, warehousing, stock administration, just as incorporate logistics tasks with different capacities including showcasing, assembling, and finance (Douglas, Martha, and Janus 1998).

As indicated by the WTO Doha Round arrangement, logistics administration is sorted out into three arrangements. The first deals with incorporate transportation management and store network counseling administrations, which are assembled under center cargo logistics administrations. The second arrangement is known as cargo related logistics administrations which include transportation benefits that are basic to the development of products through various methods of transportation. Non-core cargo logistics administrations i.e., fleet support and fix, pressing administrations, PC and related administrations were the third arrangement of activities (Saez et al., 2010).

The presence of universal rivalries has expanded significance of logistics at the firm dimension as well as at the national dimension. Large scale level logistics skills have turned out to be one of the significant reasons that separates among high and low competitive nations. Nations logistics infrastructures, including the diverse methods of transportation and related correspondence as well as data advancements, traditions principles and following skills are significant, and encourages nations to exchange trade worldwide (Burmaoglu and Sesen, 2011).

A focused network of worldwide logistics is frame of universal exchange (Arvis et al., 2010). Improvement of exchange logistics performance will upgrade nations' worldwide exchange to a great extent (Saslavsky and Shepherd 2012, Korinek and Sourdin 2011). From proof on '2007 and 2010 LPI', nations that are at the same dimension of per capital pay, those nations with robust logistics performance enjoy an extra development of 1% in total national output and 2% in exchange (Arvis et al. 2010). Recently, innovative improvements in transportation and correspondence empowers organizations to have decentralized creation errands which have now been performed in various areas. The association among these errands requires effective logistics (Kunaka, Mustra, and Saez 2013). Improvement in exchange logistics performance greatly affects the advancement of combination in universal generation systems. That is the reason Asian – Pacific where universal production is highly developed, is increasingly touchy to exchange logistics performance (Saslavsky and Shepherd, 2012).

Trade logistics alludes to various procedures and administrations that are associated with conveying merchandise from one nation into another. These incorporates customs leeway and organization, transportation, tracking and following, association and the executives of global shipments and data innovation framework. Trade logistics is resolved at a national dimension (Korinek and Sourdin, 2011). Improved exchange logistics execution will build exchanging nations' organization's capacities to react to global requests at the perfect time with lower costs, i.e., opportune time conveyance will lessen stock expenses (Saslavsky and Shepherd, 2012).

Logistics has become the center pillars of monetary improvement of nations through interfacing individuals and firms to advertise openings so nations will accomplish larger amounts of efficiency gains (Arvis et al., 2016). Accordingly, appropriate exchange and transport assistance strategies can be created if there is a right comprehension of national logistics execution (Rantasila and Ojala, 2012). Executing national dimension logistics performance estimation is fundamental to improve effectiveness of logistics execution, foundation administrations and guidelines (Rantasila and Ojala, 2012). Administrators and

specialists could seek different measures by considering significant execution measurements (Chow, Heaver, and Henriksson, 1994).

Trade logistics have turned into an undeniably extensive snag to African exchange execution in light of a significant change in the idea of global exchange that has occurred in the last twenty-five years: the blast of "exchange undertakings." In some assembling performances, a generation procedure can be deteriorated into a progression of steps or errands. Undertaking logistics based development has increased drastically in the last 25 years. The specialization in logistics management can support learning, both as far as assembling procedures and inventory network management. In any case, logistics works likewise the significance of exchange coordination. In errand-based creation, high offers of intermediates in conclusive yield amplify the impact of changes in logistics costs on overall revenues. Past these immediate costs, the consistency and unwavering quality of supply chains are progressive.

While the framework is significant, organizations and the administrative condition are similarly significant. A change of coordination administrations markets, particularly transport guidelines, is likewise high on the motivation for change.

For landlocked nations, both the physical and institutional imperatives to effective coordination are intensified by the need to rely upon neighboring nations for access to business sectors.

2.3 Pitfalls of Logistics Performance in Nigeria, Ghana and Morocco

The LPI can give a reference point, yet it ought not to be viewed as a comprehensive symptomatic instrument. The LPI is contrasted with the World Bank Ease of Doing Business index – and has some topical covers – yet it varies in various ways. While the World Bank Ease of Doing Business index utilizes information on guidelines that are "on the books," the LPI utilizes review information from logistics experts who answer inquiries regarding their encounters in different nations. This methodology is a push to all to experience precisely the everyday reality of the private segment.

Africa has seen rapid trade growth over the most recent three decades. The achievement of making an interpretation of decreased levies into expanded universal exchange has been constrained and geologically unequal. The principle explanations behind this are examined below.

2.3.1 Poor state of infrastructure

Poor quality roads and feeble transport frameworks have for some time been an issue for the African exchange, and are viewed as prime explanations behind the mainland's low dimension of aggressiveness. The vast dominant part of roads in “sub-Saharan Africa” are inadequately kept up and a noteworthy number, around 53%, stays unpaved (The African Development Bank, 2014).

Investigation finds that the high weight of separation between average urban communities in Ethiopia and Nigeria stays, even subsequent to altering for the accessibility and nature of streets (Atkin and Donaldson, 2015).

The road network situations in most parts of Africa are largely quite patchy and bumpy due to poor road construction and inadequate road maintenance. Also, budgetary constraints, bureaucratic challenges and other significant hidden costs seem to undermine the effort to provide good road networks. For instance, across Nigeria, the roads alternate between good, fair and poor. There is inefficiency in the organization of the road transport industry and fleets service in most parts of West and Central Africa (Adeyemo, 2015).

The road network in Ghana links most of the main cities, towns and villages. Road transport is significant to Ghana's economy as it is the most available means of transport in the country. It links agricultural production areas with local regional and national markets and it carries in excess of 97% of all passenger and freight traffic in Ghana (LCA, 2017).

Notwithstanding, when considering that there are both more and better quality roads in the USA, the cost of logistics is 2.5 times higher in Ethiopia and multiple times higher in Nigeria than in America. There is a finding: with its low compensation levels, Africa's

vehicle expenses ought to be much lower than in the USA if streets were of a similar quality.

Air transportation is also weak in the sub-region. For instance, Nigeria with five international airports out of 30 airports is faced with a lack of good air transportation, weak management and outdated facilities. Also, the rail lines are not well developed in the sub-region, for instance, the current rail transport lines in Nigeria are the ones built during the colonial era which have been poorly managed resulting in poor quality and under performance (Faajir & Zidan, 2016). As a result of poorly developed and managed rail infrastructure, the traffic volume via roads in the region has significantly increased, putting undue pressure on the limited poor road networks available.

2.3.2 High Cost and Complexity of doing Business

The expenses of exchange are connected to transport and systems at the borders, just as inside the nations that is Nigeria, Ghana and Morocco. Limao and Venables in their estimations have determined a duty comparable for transport costs influencing export. They reasoned that in Nigeria and Ghana this levy proportionality is about 40 percent contrasted with 15 percent in ACP nations in general. In Sub-Saharan Africa, their expenses are in excess of 50 percent higher and exchange volumes 60 percent lower than those nations with coasts. Likewise, the expense of transport comprises a significant hindrance, to advancement, yet in addition to FDI streams to Africa.

There remains a wide scope of elements that could create a high intra-national exchange costs inside African nations: the cost of information sources, for example, fuel, work, and hardware from one perspective; and market qualities, including guidelines, transport, and exchange strategies on the other. Among potential logistics costs are market entry obstructions, for example, confinements, specialized guidelines, customs guidelines, and cartels (Teravaninthorn and Raballand, 2009).

Likewise, numerous courses are under-used and trucks frequently travel short distances, or just convey a little load. Thus, potential economies of scale are not captured and internal

transport costs stay high. Some factors influencing trade costs are long duration for loading or unloading, and border checkpoints. Overall, in 2006, it took 116 days to move an export compartment from the manufacturing plant in Bangui, Central African Republic, to the closest port and satisfy every one of the traditions, managerial, and port necessities to stack the load onto a ship (OECD/WTO, 2011).

Further, because of the broad documentation necessities, customs handling delays, and non-straightforward bringing in guidelines, import and export fare methodology are likewise in all respects exorbitant and tedious. The limit of residential foundations in charge of guaranteeing consistence with global benchmarks is constrained. Moreover, nearby benchmarks differ extraordinarily and there is little harmonization with local or universal principles.

The transport framework is not even the area's most concerning issue, keeping the stable electricity on is a major challenge. "Most of the nations in sub-Saharan Africa still experience standard power-blackouts, which obviously add to a low efficiency of numerous organizations," said German Development Cooperation financial expert Matthias Grossmann in July 2011. Power is Africa's greatest framework feeble point, with upwards of 30 nations confronting ordinary power blackouts, as indicated by a 2010 report by the World Bank and France's advancement organization. "Organizations working in most African nations where power supply is inconsistent have depended on acquiring diesel-worked control generators, which increases working expenses radically", said Jens Schleuniger, Africa Portfolio Manager at VCH Asset Management in Frankfurt.

2.3.3 Government Policies, Regulations and Restrictions

Acemoglu and Robinson attest in their fundamental book "Why Nations Fail" that the significant contrast between developed nations and developing nations is in their political advancement. Developed nations have political and monetary frameworks that are comprehensive and offer open doors for a great many people to become rich.

Most developing economies have political and financial frameworks that are exploitative. Those in the decision class have a solid hang on political power, and use it to channel monetary assets to profit themselves and those near them. Foreign aid, when diverted through such extractive frameworks, never comes to the most helpless in the public arena. We have to reconsider the type of help Africa needs and the stages for disseminating or offering it.

Additionally, globalization is the truth of our day and age. There is expanding financial, social, specialized, social and political reliance between countries. Individuals are more inter-related now than any time in recent memory. The accessibility of overall correspondence frameworks through fast enhancements in correspondence innovation and the web has prompted progressively worldwide exchange and social trade. Nevertheless, globalization does not seem, by all accounts, to be elevating Africa's advancement. The issue is additionally established in the political structure and the initiative culture pervasive in Africa.

2.4 Assessment of Trade Logistics Performance in Africa

According to the World Bank report on Africa trade performance, over the most recent three decades, the market share of Africa in world trade has dropped by almost 60% from 3.5% in 1970 to 1.5% before the part of the bargain. This sensational decrease in Africa's share of the world trade implies a huge loss of \$70 billion every year, a sum proportionate to 21% of the locale's GDP and to in excess of multiple times the \$13 billion in yearly guide streams to Africa. Poor logistics and trade performance have been firmly connected to the low development of per capita earnings in the locale. Fare development and expansion are basic if African economies are to develop and Africans are to get an opportunity to win better livings. A portion of the issues confronting Africa are as per the following;

A. An Unsupportive Investment Climate

Investment rates in Africa are low and should be considerably brought up in quest to

quicken development and destitution decrease. An unsupportive speculation atmosphere is as yet a noteworthy issue in most African nations. Borders and immigration policies that hinder private investment and suppress a supply response to improve market access and trade policies are serious limitations to growth and competitiveness. For instance, in many nations;

- The legal, regulatory, and tax structure for business is unsatisfactory;
- The weak administration coupled with corruption and inefficiencies negatively impacts on confidence;
- The infrastructure of many types is inadequate; and
- The transport, telecommunication, and monetary services that aid trade are poor.

To stimulate a strong supply response, trade reforms must be a part of a broader package of measures to enhance the investment climate.

B. Unfinished Liberalization of Trade

Regardless of the noteworthy advancement made in changing trade during the 1990s, African nations still keep elevated levels of nominal and effective insurance for import-competing businesses; hostile to fare predisposition is solid, and progression is inadequate. As of late, a couple of nations have begun to pursue progressively forceful fare development techniques with empowering results; at the same time, on a landmass wide premise, send out extensions and broadening show up the truth to be a low nation's needs. In spite of the fact that the unweighted normal tax is about 16% (Navickas et al., 2011), the wide-spread routine with regards to requiring the most astounding duty rates on practically all locally delivered products. While absolving the imported sources of information used to create these, it prompts higher insurance for import-contending enterprises as well as wasted resources. The apparent security rates for import-contending industry ranges from 30% to 35%, while the feasible insurance rates are usually 70-80%.

Not many nations give exporters compelling access to import-obligation and backhanded tax exempt information sources. Wasteful and degenerate traditions organizations are a considerable extra restriction on trade and intensity. Thus, hostile to fare predisposition is still very high.

C. Behind-the-Border Trade-related Reforms

Inside the wide scope of issues, which should be tended to so as to improve the business atmosphere and supply reaction, two specific trade-related behind-the-fringe issues stick out:

1. **Customs Reform:** In about each nation a noteworthy establishment building exertion is required to change and improve traditions organization with the goal that traditions encourage trade as opposed to impeding it.

- Inefficiency and debasement in traditions organization raises the expense of the two imports and fares and restraints trade mix just as causing income misfortunes and undermining administration.
- As noted before, not many nations give exporters powerful access to import obligation and circuitous expenses (VAT) free input, regularly on the grounds that traditions cannot actualize duty refunds and comparable measures.
- Poorly working travel plans are a genuine snag to growing trade in a significant number of the district's landlocked nations.

2. **Trade Facilitation:** Improvements in trade-related infrastructure and arrangement of efficient, focused trade-related administrations are required:

- The key transport territories are streets, street transport, ports, and carrier administrations.

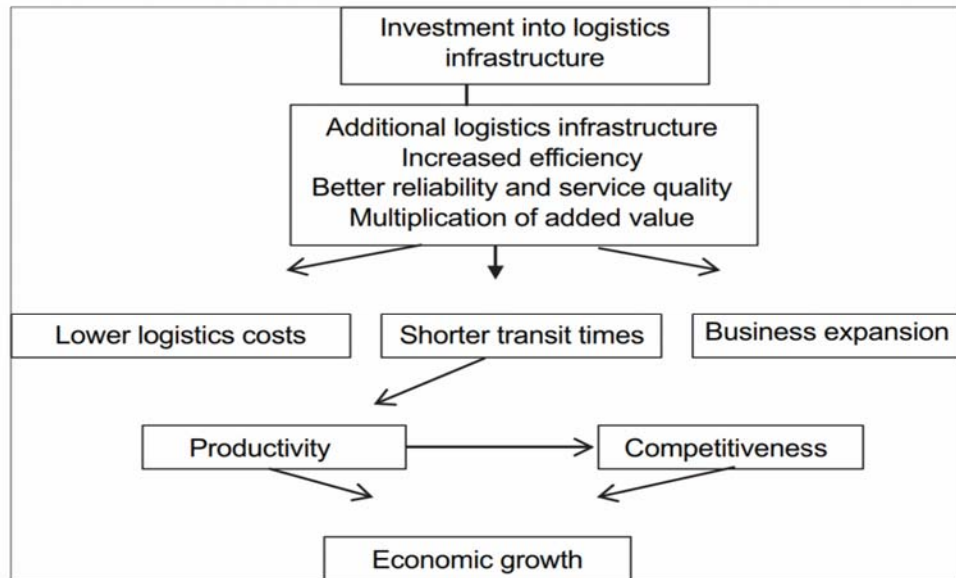
- Particular consideration is required to evade wasteful imposing business models and other lease looking for conduct with the goal that fundamental administration enterprises support instead of choke trade development.
- A significant related administration change is the expulsion unlawful barricades on inside streets that comprise an accepted duty on trade.
- Compliance with worldwide measures is required for African makers to viably exploit advertise openings.

D. Distributional Impact of Trade

Due to the very low average degree of income and high rate of poverty in Africa, facilitated development is needed for poverty reduction. Improved trade-performance is, thus, fundamental for accelerating development and is subsequently a key component of broad-based poverty-reduction. In any case, safety nets for securing the most susceptible are weak, elevating the challenge of dealing with the changes from closed to open economies. To strengthen the bridge between trade expansion and poverty alleviation and to better coordinate transitional effects, the distributional impacts of trade expansion are a fundamental characteristic of the Region's diagnostic trade integration studies, which ought to be looked at.

2.5 Role of Logistics in Economic Development

Improvements in developing the worldwide economy and increased competitiveness make logistics an area which is significant. Appropriately, advancements in logistics area have turned into a pushing power related with development of nations. Expanding interests around there and the shaping of logistics systems has given focal points to nations. For instance, between 2012 - 2018, exports of merchandise and services represented 39% of the GDP in the MENA region. Thus, nations have right now expanded their interests around there and logistics area has turned out to be noticeable as a section, which develops quickly.



Source: Navickas et al. (2011)

Figure ii Impact of Logistics Venture

Figure ii shows the impact logistics venture has on monetary development. As needs be, putting resources into logistics infrastructure has expanded as a logistics limit, gives ascent of productivity, improves the nature of administration making a protected area, and furthermore gives an expansion in included worth. So this gives space for low logistics costs, short transportation time, and making of work augmentation openings. Subsequently, this procedure can expand productivity and intensity power for nations thus likewise helping financial development.

Demurger (2001) explored connection between infrastructure ventures and financial development. In this examination, it was discovered that speculations on transportation and media transmission have positive huge effect on monetary development. There was a positive noteworthy connection between ventures of logistics division (transportation,

stockpiling, mailing, and media transmission) and financial development.

The logistics division advancement in African nations can be said to be one of the most significant determinants of monetary development. Along these lines, approach executions of governments to empower interests around them will influence decidedly financial development. For example, administrations which are given transportation infrastructure that speaks to a significant part of logistics segment assume a fundamental job on the financial exercises of nations. While interests here decline transportation costs, they encourage trade by expanding the portability of merchandise and ventures. Correspondingly, improvements in media transmission aids data exercises, advancement, selling, requesting, and make transportation administrations simpler and quicker. Therefore, we can say that the improvements of logistics parts have a critical effect on a nation's financial development and advancement process by giving a significant challenge advantage.

2.6 Logistics Performance Parameters/Measures

So as to encourage arrangement changes far and wide, the World Bank estimates nations' logistics performance. The Bank logistics measures are two sorts, domestic LPI and universal LPI. The household LPI survey local conditions to make sense of logistics requirements inside nations. It isn't identified with borders or posts. Worldwide LPI measures nations exchange logistics performance, by utilizing a far-reaching proportion of the effectiveness of nations logistics on global exchange. The record is critical to discover national logistics challenges for development and adventure open doors for development. The LPI comprise of six pointers: customs and border management, framework, administrations quality, practicality, universal shipments, and following and following (Arvis et al. 2014). Here after, LPI in this exploration alludes to the universal LPI.

Logistics administration has a double job in exchange. Improvement in Logistics performance will directly affect the merchandise exchanged; then again, high Logistics

costs are significant hindrances for exchange (Kunaka, Mustra, and Saez 2013). It is critical to expand responsiveness and decrease cost all the while. Logistics is one of the biggest cost segments for universal exchange; in 2003 the worldwide logistics consumption rose to 13.7 percent of the complete world Gross Domestic Product (WGP). Then again, the world GDP can be expanded by improving nations logistic efficiencies (Bowersox, Calantone, and Rodrigues 2003). Decreasing Logistics costs will prompt lower exchanging costs at the national levels as well as worldwide dimension, and for the most part increment gains from exchange.

2.6.1 Performance Indicators

It is obviously seen that the World Bank's worldwide LPI is anything but a total measure, explicitly a standout amongst the most significant part, which is the logistics cost is not evaluated through the list. Improving exchange logistics execution without lessening cost, will block exchange logistics from having a noteworthy commitment in expanding a nation's exchange of aggressiveness. Thus, operational exchange logistics cost measure has been incorporated into this study just as a pointer proposed by World Bank. A significant picture for every one of national exchange logistic performance pointers as depicted in regard to various hypothetical confirmations in the accompanying paragraphs are:

1. Customs and Border Management

Borders separate sovereign states domains, for example, land borders, ocean borders, and air borders. Sovereign states whose borders has been crossed have appropriateness to force principles to permit a section of individuals, vehicles, and products. People are checked from immigration. Customary obligations will be forced on intersection products. Despite the fact that a significant number of these standards are liable to universal understandings, the sovereign states whose borders have been crossed, practise selective rights to present guidelines about border crossing. The traditional leeway that happens at border stations,

or checks, focuses to ensure that the traffic crossing the borders satisfies the country's lawful prerequisites (Miller et al. 2012).

2. Infrastructures

Infrastructure alludes to capital that incorporates transport-related offices, broadcast communications, water and wastewater facilities, vitality generation and conveyance. Infrastructure advancement is considered as an essential for improvement (Straub 2008). Exchange and transport infrastructures are partitioned into two: hard and delicate. Hard infrastructures incorporate physical frameworks (ports, airplane terminals, railways, streets) and data and correspondence innovation. Delicate frameworks are identified with institutional perspectives and business and administrative condition (Portugal-Perez and Wilson 2010). Transport framework likewise, incorporates accessibility of components, for example, vehicles, shipping holders, beds, terminal offices for landing, stacking and emptying, multipurpose offices to interface diverse methods of transport: flagging and traffic control for framework working (Korinek and Sourdin, 2011).

3. International Shipments

Shipment is characterized as the tender of cargoes at one time from one shipper to one representative on one bill of lading (Maritime Administration 2008). On account of worldwide cargo transport, the cause and goal of cargoes are situated in various nations (Waters and Rinsler, 2014). Choosing global shippers for cross-border exchange requires thinking about various factors in choosing the correct method of transport and transporter. These components incorporate accessibility of conceivable choices, volume, and weight of cargoes, the estimation of merchandise, perishability, criticalness and hazard (RGX, 2016). Currently, it is troublesome for organizations to be aggressive without diminishing expenses brought about all through the inventory network and persistently improving the nature of merchandise and enterprises at the same time. In light of the investigation of articles distributed during 1994 – 2013, foreign logistics (3PL) specialist organizations' determined criteria are assessed. Out of eleven criteria recognized for 3PL choice, cost is the most regularly connected criteria pursued by relationships, administrations, and quality

(Aguezzoul, 2014). In developing the intensity of 3PL in inventory network, coordinated ports have turned into a basic piece of production network in global shipments. Most significant criteria connected for port determination from the cargo forwarders points of view, are distinguished and positioned as pursues: port effectiveness (speed and unwavering quality), shipping recurrence, satisfactory framework, area, port charges, snappy reaction, notoriety for cargo damage (Tongzon, 2009).

4. Service Quality

Understanding clients' prerequisites and desires as far as logistics performance and actualizing the most effective activities is required to achieve consumer loyalty (Bottani and Rizzi, 2006). Quality logistics administration assumes a significant job in encouraging universal exchange of merchandise that are transported via ocean and air. Brilliant exchange logistics administration as far as framework, traditions systems, logistics skill, and following and following upgrade nation's fare by decreasing expense and deferral. This is particularly significant for nations that are topographically hindered i.e., landlocked nations, and nations a long way from real markets (Korinek and Sourdin, 2011). The execution of exchange inventory network consistency and unwavering quality are dictated by a lot of elements: nature of exchange related frameworks, quality administration, and accessibility of private part administration and proficiency of exchange techniques (McLinden et al., 2011). In an experimental research, logistics administration quality properties are exhibited through five measurements: dependability, responsiveness, skill, sympathy, and substantial quality. This study demonstrates a solid positive effect of logistics administration quality on fulfillment and steadfastness of clients (Kilibarda and Andrejic, 2012).

5. Tracking and Tracing

As per GS 1 definitions, tracking is characterized as the capacity to pursue the way of a recognizable thing through the production network as it moves between gatherings i.e., realizing where objects are presently. Following goes further, following alludes to the capacity to discover root, properties, or history of a specific discernible thing situated

inside the production network by utilizing its code i.e., where were my items last Sunday evening? (Ryu and Taillard, 2007). Production network accomplices can track and follow data on their shipments over the logistics chain through advances i.e., GPS, GTIN, RFID, Barcode. Ongoing following and following are basic to oversee coordinated logistics systems and to expand client administration. The nonexclusive following and following administration is making an impression on a following database when an item lands at a predefined place in logistics organize. Such messages contain data on the area of entry and landing time (Shamsuzzoha and Helo, 2011). Imparting important data to all accomplices of the store network empowers shippers to guarantee start to finish imperceptibility of shipments. Thus, this, will improve the execution of store network (Kaipia and Hartiala, 2006).

6. Timeliness

A party must complete its commitments if a timeline is fixed, around then or inside a sensible time after the agreement has elapsed, if time is not fixed (UNIDROIT, 2010). On time conveyance is neither early nor late conveyance (Harrison and Hoek 2014). One of the fundamental strategic objectives in most administration level understanding is accomplishing On Time in Full conveyances (OTIF). The key parts of OTIF conveyance incorporate conveyance with: complete amounts requested, precisely to client's mentioned date and time, no conveyance issues (deficiency, harm), right and complete conveyance documentation (Rushton, Croucher, and Baker 2010). On time total conveyance, fitting in with request detail, is one of the aggressive measurements utilized by organizations (Harrison and Hoek, 2014). A Nation's capacity to send out on time is one wellspring of the near preferred standpoint which is as significant as variables of creation in global exchange. Especially, practicality is progressively significant for middle of the road merchandise. The area of creation offices affects convenient conveyance of parts and segments (Gamberoni, Lanz, and Piermartini 2010). Then again, delay is an obstruction to exchange. In light of a gauge when it takes to transport containerized cargoes from the industrial facility to dispatch in 126 nations, overall every additional day an item

postponed from a booked shipment will diminish exchange by something like 1 percent. A bigger impact can be seen on the fare of time touchy merchandise i.e., short-lived horticultural items and travel cargoes of landlocked nations (Djankov, Freund, and Pham 2010).

2.7 Summary and Knowledge Gap

The six segments of the LPI are for the most part factors in logistics performance dependent on the existing body of knowledge found on the individual segments. However, not much published work is accessible on how significant they are contrasted with one another. This underlines the requirement for the assignment of weights to the various factors in logistics performance so as to give space for objectivity. To address logistics performance, it is significant that all elements are thought of. Other than the six segments, there could be different components that could be critical in logistics performance. Cognizant to this, in the poll to be conveyed, an arrangement will be made for the experts to propose different components that ought to be paid attention to in the logistics performance.

CHAPTER THREE

CONCEPTUAL FRAMEWORK

This chapter gives the general structure to be received in this examination for breaking down, assessing and improving the logistics performance index (LPI) of a nation's financial development. The point of this is to get a clearer picture of the idea to be managed in the investigation. Legitimization of the structure is exhibited, and the chapter, likewise, gives the investigation's working hypothesis. This examination means to explore the effect of logistics performance on fares and imports.

3.1 Framework of the Study

The factors under scrutiny are LPI (independent factor) as an intermediary for logistics performance and 'export' of merchandise and enterprises (dependent variable) (in US\$) as an intermediary for fare. In 2007, the World Bank began LPI as an approach to quantify the logistics performance of nations around the globe. The record depends on a study done on organizations that moves products crosswise over nations. It is comprised of six fundamental parts; namely “customs, infrastructure, ease of arranging shipments, quality of logistics services, tracking and tracing and timeliness”. LPI is viewed as the most appropriate approach to quantify nations' logistics performance (D'Aleo and Sergi, 2017). LPI segments are confirmed by hypothetical and exact research, notwithstanding the sentiment of specialists in the field of global cargo sending.

The reliant variable in this examination is trades, exporting exercises is fundamental for a firm's development as it gives an approach to diminish reliance on the household showcase by entering new advertises which help in broadening its business sectors and consequently decline its hazard and cost, notwithstanding expanding its general proficiency. Fares are likewise significant for financial development, as fares improve a firm's development it adds to a business's advancement, which expands openings for work and in the long run

decline the joblessness rate. Further, it causes an increment in the foreign exchange reserve held by national banks, which influence nations' imports (Filipe Lages and Montgomery, 2004).

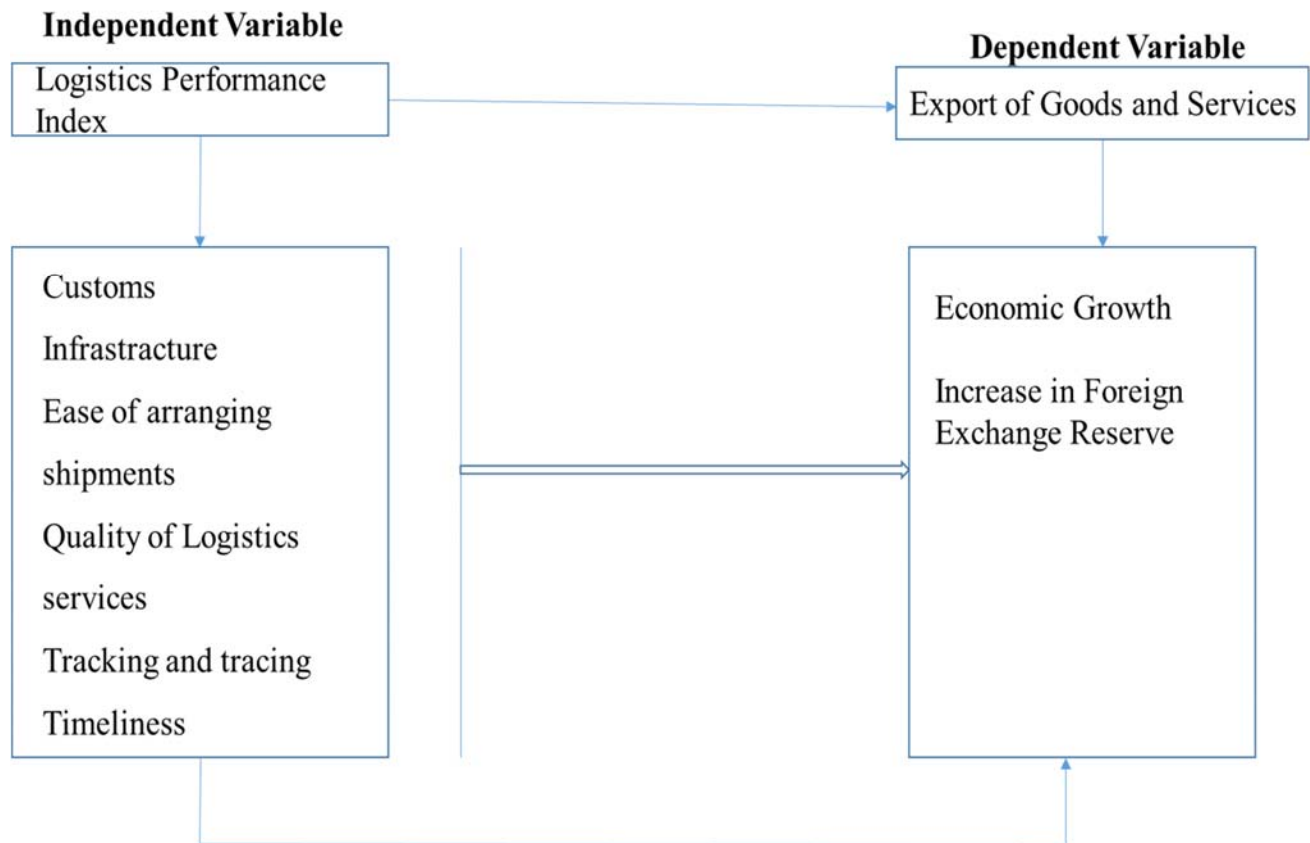


Figure iii The Applied System for Investigation

3.2 Research Hypothesis

Hypothesis testing is a type of factual induction that utilizes information from an example to reach determinations about a populace parameter or a populace likelihood dissemination. Hypothesis tests are additionally directed in relapse and connection examination to decide whether the regression relationship and the correlation coefficient

are factually noteworthy. A decency of-fit test alludes to a hypothesis test in which the null hypothesis is that the populace has a particular probability distribution, for example, an ordinary likelihood circulation. Nonparametric statistical strategies likewise include an assortment of hypothesis testing techniques. To test the impact of LPI and its components on exports, the hypothesis below was derived:

H₁: LPI's 6 parameters do not affect exports to the same extent.

H₂: Infrastructure is more important a LPI parameter than other parameters for exports.

To test for these hypotheses, the following was done:

- a) Examine the 6 parameters of the World Bank LPI for the 3 countries in Africa
- b) Based on a) verify, analyze and measure different effect of each of the 6 parameters on the country's import and export.
- c) Based on b) to suggest a differentiated "weighting" scheme for LPI (instead of the equal weight scheme).
- d) Based on c), re-rank the three countries, identify the most critical issues and make conclusion and recommendations.

These hypotheses were to be tested for their level of significance using the Excel Data Analysis Toolpak based on the Questionnaires responses received from the experts.

3.3 Trade Logistics Performance in Africa

In 2012 – 2018, exports of products and ventures in the Middle East and North Africa (MENA) district increased at 5.7%, while exports of merchandise and enterprises in Sub-Saharan Africa (SSA) developed at 2.2% showing the most minimal development among the developing areas (see Table 3.1). In a similar period, exports of merchandise and ventures had a portion of 39% of the GDP in the MENA locale, with a lot of exports of products and enterprises at 35%.

Morocco's exports to Sub-Saharan Africa have denoted a normal yearly development of

18% to 11.7 billion dirhams in 2018 against 2.2 billion dirhams in 2003. This represents 6.3% of Morocco's complete exports in 2018 against 2.7% in 2003. Imports from Sub-Saharan Africa have not endured a similar destiny and stay constrained. They totaled 2.8 billion dirhams in 2018 in the wake of arriving at a limit of 4.5 billion dirhams in 2010. While they represent 1.8% of Morocco's complete imports in 2003 this figure scarcely surpassed 0.7% in 2018.

As to the goals of Moroccan exports, the fundamental SSA clients of Morocco are Senegal (with a portion of 17% in 2018), Mauritania (10%), Côte d'Ivoire (8.1%), Guinea (8%), Nigeria (7.7%), Ghana (7.3%), Angola (4.8%) and Equatorial Guinea (3.9%). Senegal is the nation whose offer has encountered the biggest increment (+6.4 rate focuses), trailed by Guinea (+4.7 focuses) and Ghana (+3.4 focuses).

The purposes behind SSA's poor trade performance are multifaceted. SSA is unmistakably obliged by its irregular physical and financial topography and compelled access to the ocean. The impact is the higher trade expenses and low profitability. Mbabazi, Milner and Morrissey (2006) affirmed that the poor SSA development performance can be clarified by the mix of components, for example, low degrees of receptiveness, high common boundaries to trade (particularly staggering expenses of vehicle to inaccessible unique markets) and export reliance on essential items.

As of late, Nigerian ports have experienced arrangement of changes which have required huge audits of their activities. Despite the fact that the subsequent concessions have wiped out a portion of the pre-change issues and pulled in assets for interests in both infrastructure and superstructures, there still exists a few difficulties that have contrarily affected their performance. These difficulties may incorporate (yet not constrained to) port clog, traffic blockage, and traditions delay. The bunch of ventures and other business exercises around the port leave it with next to zero space for extension to oblige the consistently developing trade into and out of the nation. The poor state of streets prompting the port, just as the absence of the sufficient operational limit by administrators and

traditions to execute their capacities makes the port much progressively risky.

Then again, the report, "Associating with Compete 2016 - Trade Logistics in the Global Economy," demonstrated that Ghana moved 12 places up from 100th in 2014 to 88th in 2016 out of 160 nations. This is the largest year on year increment in Ghana's worldwide LPI positioning since the overview was first attempted in 2007. Specific upgrades were noted in the general practicality of Ghana's shipments arriving at their goal inside the booked time and the productivity of Customs and Border Control Agencies likewise indicated real enhancements. The effectiveness of traditions and outskirts management freedom demonstrated a checked improvement of 37 points, with past descending patterns of - 27 and - 17 of every 2014 and 2012 separately. The recurrence with which shipments arrive at representatives inside planned or expected conveyance times (Timeliness) segment additionally chalked up an improvement of 31 points contrasted with 12 and 17 in the years 2014 and 2012.

Table 1 Key Macroeconomics Indicators of Trade Logistics Performance in Developing Regions

Region	GNI Per Capita	Export of Goods and Services	Imports of goods and services	Exports of goods and services	Imports of goods and services
SSA	1,353,	35	35	2.2	-2.4
MENA	3,439	39	33	5.7	-4.9
SA	1,462	22	31	2.1	6.1
EAP	4,884	34	31	3.1	4.7
LAC	8,981	24	26	3.8	6.0

Source: Compiled from World Development Indicators Online Database (Available at: <http://www.worldbank.org>).

3.3.1 Trade Logistics Cost

2012-2018 distributions of the IMF's Direction of Trade Statistics demonstrates that most nations in SSA, trade more with nations in different areas of the world. Accordingly, more than 80% of the exports from Low-Income-Sub-Saharan nations go to nations outside of the Sub-Saharan district (\$85.2bn in 2006). These nations just exported \$4.5 billion to Sub-Saharan center salary nations and \$9.4 billion to other Sub-Saharan low-pay nations. Thus, the dominant part of SSA center salary nations trade with nations outside the sub-Saharan area. Sub-Saharan nations likewise import principally from nations outside their own area. Figure 3.2 demonstrates the import versus export cost for all the creating districts of the world. The figure demonstrates that both MENA and SSA spend more on importation that exportation.

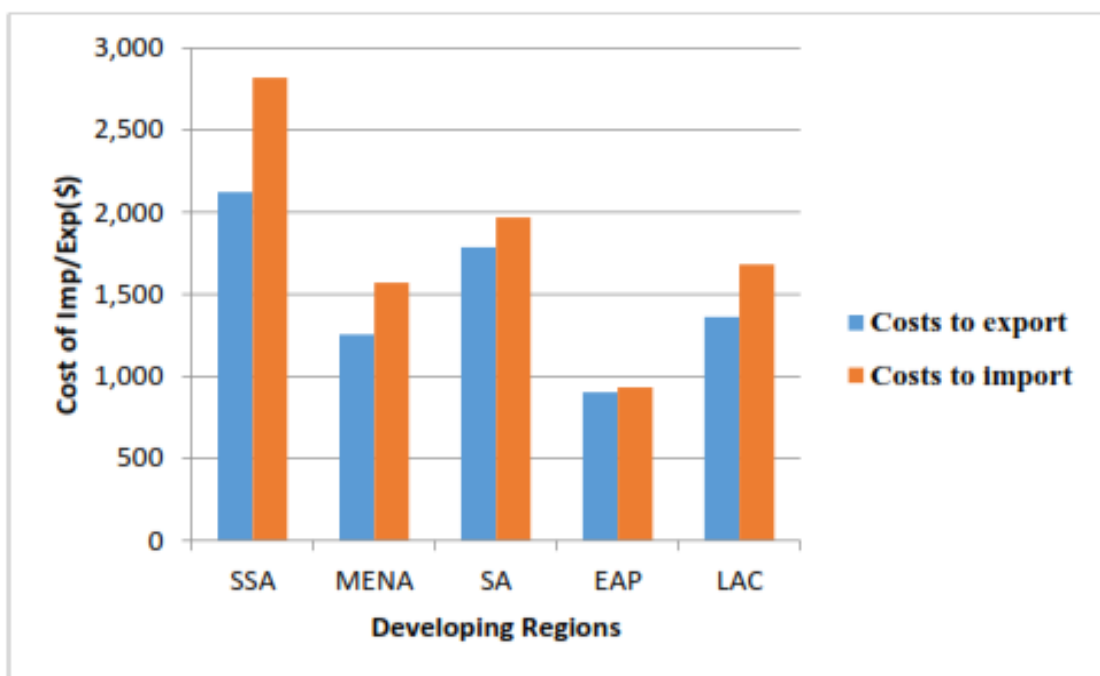


Figure iv Costs to Import and Export (US\$/Container)

(Source: World Bank, World Development Indicators)

3.3.2 The Effect of Trade Logistics Performance in the African Economy (Nigeria, Ghana and Morocco)

Proof recommends that improving trade positively affects both the development and level of pay. Sub-Saharan African economies are ordinarily little, undiversified and experience the ill effects of frail infrastructure. With over half of the populace living underneath \$1.25 every day, SSA has a higher portion of the populace living in neediness than some other area in the world. A lot of world trade has run between roughly 1.3% and 2.2% in the course of the most recent two decades. Sub-Saharan Africa's trade has developed at generally low rates since the 1950s, with the outcome that today the area's offer in world

trade remains at around 1 percent, down from in excess of 3 percent in the mid-fifties (Yeats, 1997).

SSA nations during the 1990s, have encountered a genuine GDP development estimating simply 2.4 percent by and large. Yet, starting in 2001, SSA enlisted its best monetary performance since 1980. Area wide genuine Gross Domestic Product (GDP) developed at a normal yearly pace of 4.6 % from 2001 through 2005, and is assessed to have developed at a yearly pace of 5.8 percent during 2006. In 2012, SSA encountered a GDP development of 4.3% when contrasted with 3.0 % for the Latin America and the Caribbean (LAC) district and portion of trade of GDP was 70%. Somewhere in the range of 2000 and 2012, portion of exports of GDP ascended from 34% to 35%.

Expanded exports have helped fuel this monetary development as from 2001 to 2005 as the estimation of product exports from SSA expanded by almost 19 % yearly. The Middle East and North Africa (MENA) area, by and large, experienced trade development of 3% in the late 1990s, and 5.6% somewhere in the range of 2000 and 2004 with trade development quickening to a norm by 7% somewhere in the range of 2005 and 2007. Worldwide exports expanded by 14.3% every year over a similar period. The mining and assembling division has progressively commanded SSA's product exports, representing 89% of the aggregate (excluding unique arrangements) in 2005.

In 2007, trade volume in the SSA district was evaluated to have developed by 6.4% on a cross-country normal premise, the most reduced rate in the developing world and speaking to a reduction from the 7.9 % development showed in 2005-2006. Export development was also low at 6.1 percent, down from 7.8 percent in 2005–2006 and from over 8% in the earlier decade.

THISDAY's Iwori (2012) announced that the concession Acts had upgraded proficiency at the port and disposed of a portion of the weaknesses noticing that Nigeria's economy had spared about USD 200 million, which bearers used to gather as a blockage additional charge. Looking at the pre and post concession times of the ports, Eniola, Njoku, Oluwatosin, and Okoko (2014), noticed that the concession period has prompted the

development of exceptionally enormous vessels and more noteworthy cost viability, speed in conveyance, improved payload taking care of and diminished unit cargo costs. This is because of the change of activities that got operators with technical expertise in handling of cargo. As to trade with African nations, the measurements revealed in the investigation by the Directorate of Studies and Financial Forecasts (2014) mirrors a general net increment in imports and exports over the period 2003-2013. The European Union has concerted in 2014 an enormous piece of trade of Morocco. In particular, it spoke to 51% (126,6Mds DH) of complete exports and 63.3% of Morocco (197,1Mds DH) of its imports.

CHAPTER FOUR

RESEARCH METHODOLOGY

Secondary archival data were collected, reviewed and statistically analyzed using Microsoft Excel Data Analysis Toolpak to explore relationships between variables considered in the conceptual framework (see section 3.1). This chapter highlights the steps of the statistical analysis and hypothesis testing (in answering the research questions), and highlights the details of TOPSIS as a multi-criteria analysis tool and its systematic steps. The strategies used in providing answers to the research questions include: design of the research; the sampling technique; and sources of data; and data collation and analysis. It also touches some ethical issues considered during the study.

4.1 Nature and sources of Data

The data utilized in this study were sourced from secondary sources in addition to the expert opinion from administered questionnaires. The secondary sources comprised published periodic reports of major players. The key sources of data include the following: **a.** Logistics Performance Index published by World Bank **b.** the Liner Shipping Connectivity Index produced by UNCTAD. According to World Bank data base LPI was calculated from 2012-2018 for over 160 countries. For the purpose of this study, only three countries in Africa (Nigeria, Ghana and Morocco) are selected.

All extracted data focuses on the key elements, ensuring that only essential information is presented. The sequel to this, is all tables and charts are adopted from reports for the purpose of analysis.

4.2 Research Design

This study adopts quantitative and qualitative methods of analysis. It is also inductive in style as the analysis is drawn largely from already established data sources balanced by judgmental opinions from surveys. Both primary and secondary data provides the necessary input for a multi-criteria decision model that would be developed in this study

using the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). This model will, without any form of bias analyze, evaluate and suggest viable ways to improve the Logistics Performance Index (LPI) of Nigeria, Ghana and Morocco based on the six criteria (“customs, infrastructure, ease of arranging shipments, quality of logistics services, tracking and tracing and timeliness”).

In the questionnaire sent out, a space was provided for the experts to assign weights to each of the six criteria and also to suggest if there are new criteria ought to be considered when analyzing LPI of countries, which are currently not being accounted for or considered by the World Bank. The weighting by the experts against each of the criteria will influence our decision on whether the equal weighting across the criteria by World Bank is justified or not. For the multi-criteria decision model, an average of the weight by the experts and secondary sources will be used.

The Logistics Performance Index by World Bank and Liner Shipping Connectivity Index by UNCTAD were compared to see how their index rating vary for the three countries considered in this study. Finally, econometric analysis (using Excel Data Analysis Toolpak) was carried out to find the relationship between the variables and test the significance of the hypotheses.

4.3 Survey and Procedure of Data Collection

Based on the fact that the study relied largely on existing data, it used and compared both the data from the Liner Shipping Connectivity Index produced by UNCTAD & World Bank Logistics Performance Index. A survey instrument on the other hand, was administered to a total of 10 practitioners and stakeholders selected non-randomly from shipping companies (such as Maersk), terminal operators, logistics and supply chain managers, freight forwarders, manufacturers/shippers and regulators. Great care was applied in designing the survey instrument to ensure consistency of responses and opportunities for new insights with respect to the criteria weights and introduction of a new performance variable where possible. A pilot distribution was done to capture major corrections and discrepancies before the actual distribution to respondents. The questionnaire was backed by emails, calls, SMS and video chats on social network (skype, WhatsApp and Viber) as a means of follow-up and support for the respondents. It is important to state here that a few short interviews were also conducted in the course of the follow-up.

4.4 Population and Sample

Selection of Company: The LPI is designed based on a survey with respondents that are experts in the field of international shipping and logistics. The firms selected are multi-nationals either domestically registered or operating in Nigeria, Ghana and Morocco, that is owned fully or partly or have notable dealings of foreign concern. The firms were also selected on the basis that they trade (import and/or export) using sea transport (or maritime logistics) and that at least 10% of their activities are export transactions. Each of the survey respondents was asked to rate the three nations on the six components, based on the respondent's experience with the logistical performance of these countries. The experts were asked to give a rating between 1 and 5 on the 6 different components: "Customs, infrastructure, quality of services, timeliness, tracking and tracing, and ease of arranging shipments" for each of the countries.

Selection of Traded Goods: The study focuses on cargo of significant value that can be transported in containers expressed in ‘TEUs’.

4.5 Data Analysis and Reliability

Due to the comprehensive approach the study takes, different quantitative and qualitative methods of analysis which are used depending on what method(s) suits the aspect of the study being analyzed. The general list of the methods used is as follows:

a. Qualitative analysis:

- i. Analysis of strengths, opportunities, and limitations.
- ii. Survey Analysis: From questionnaire responses used for the survey.

b. Quantitative analysis:

- i. Econometric analysis (using Excel Data Analysis Toolpak) to test the hypotheses and find the relationship between the variables, Descriptive Statistics, Trend Analysis (with Excel).
- ii. Performance Indicators (output and service), and Comparative Analysis using a Multi-criteria analysis model (TOPSIS).

4.5.1 Microsoft Excel

‘Microsoft Excel’ contains an incredible measurable bundle where one can ascertain everything from methods and medians to chi-square. One can likewise run a hypothesis test. It has a programming perspective, Visual Basic for Applications, empowering the client to use a wide assortment of numerical strategies, for example, for settling differential conditions of scientific material science, and afterward revealing the results back to the spreadsheet. Moreover, it has an assortment of insightful highlights allowing UIs that can thoroughly cover the spreadsheet from the client. Hence, the spreadsheet presents itself as a purported application or choice emotionally supportive network (DSS), by methods for a uniquely made UI, for example, a stock analyzer. It can also serve as a structure apparatus

that asks the client inquiries and offers responses and reports (De Levie, 2004). In an increasingly acknowledgment, an Excel application can consequently survey outer databases and estimating instruments using an update plan, examine the results, make a Word report or PowerPoint slide show, and email these introductions all the time to a rundown of members (Harvey, 2007).

The Windows rendition of Excel supports programming through Microsoft's Visual Basic for Applications (VBA), which is a lingo of Visual Basic. Programming with VBA licenses spreadsheet control is cumbersome or incomprehensible with standard spreadsheet strategies (Seref and Ahuja, 2008).

From its first form, Excel bolstered the end client programming of macros (robotization of dreary errands) and client characterized capacities (expansion of Excel's worked in capacity library). Exceed expectations supports outlines, charts, or histograms made from determined gatherings of cells. Exceed expectations gives a few decisions to hypothesis testing utilizing z-scores: utilizing the Data Analysis Toolpak to run a two example test for methods, or one can physically compute the z-score. In this investigation, the Data Analysis Toolpak is utilized.

Hypothesis Test in Excel: Steps

Stage 1: Type your information into a solitary section in Excel. For instance, type your information into cells A1:A40.

Stage 2: Click the "Information" tab and afterward click "Information Analysis." If you do not see the Data Analysis catch, at that point you may need to stack the Data Analysis Tool Pak.

Stage 3: Click "Expressive Statistics" and afterward click "alright." When the Descriptive Statistics discourse box opens, click "Outline Statistics" and after that type the area for a cell where you need your outcome to show up. For instance, type " B1."

Stage 4: Click "okay." An assortment of graphic insights, similar to the middle and mode, will be seen beginning in cell B1.

Stage 5: Locate the cells that have the mean and the standard blunder brings about it. On the off chance that you composed in cell B1 in Step 3, your mean will be in cell C3 and your standard mistake will be in cell C4. Take a note of those cell areas.

Stage 6: Type the accompanying recipe into cell D1 (expecting your mean is in cell C3 and your SE is in cell C4 — in the event that they are not, you will have to modify the equation):

$(C3-0)/C4$

Change the "zero" to mirror the mean in your invalid hypothesis. For instance, in the event that your invalid hypothesis expresses that the mean is \$7 every hour, at that point change the 0 to "7."

Stage 7: Press "Enter" to get the estimation of the test measurement. Contrast the incentive with the acknowledged an incentive for your mean from the z-table*. On the off chance that the test measurement falls into the acknowledged range, at that point you will neglect to dismiss the invalid hypothesis.

4.5.2 Technique of Order Preference by Similarity to Ideal Solution (TOPSIS)

The TOPSIS tool “depends on the idea that the selected option must have the least geometric distance from the positive ideal solution and the farthest geometric distance from the negative ideal solution” (Assari et al., 2012). It analyzes a set of options by assigning weights on each factor for comparison, normalizing the weights for each factor and computing the geometric distance between each option and the ideal positive alternative. TOPSIS assumes that the factors are ‘monotonically’ rising or reducing (Beg and Rashid 2014). Normalization is typically needed because the factors are quite unharmonious which is typical of a multi-criteria problem. TOPSIS “permits trade-offs

between the factors, where a negative outcome in one factor can be nullified by a positive outcome in another factor” (Greene et al., 2011). This gives a more realistic form of modeling and comparative analysis.

TOPSIS takes into consideration three classes of attributes or criteria:

- Qualitative benefit attributes/criteria
- Quantitative benefit attributes
- Cost attributes or criteria

With TOPSIS two artificial options are hypothesized:

- Ideal alternative: the one with the best attribute values.
- Negative ideal solution: the one with the worst attribute values.

TOPSIS chooses the option that is the nearest to the ideal solution and farthest from negative ideal solution (Huang et al., 2011).

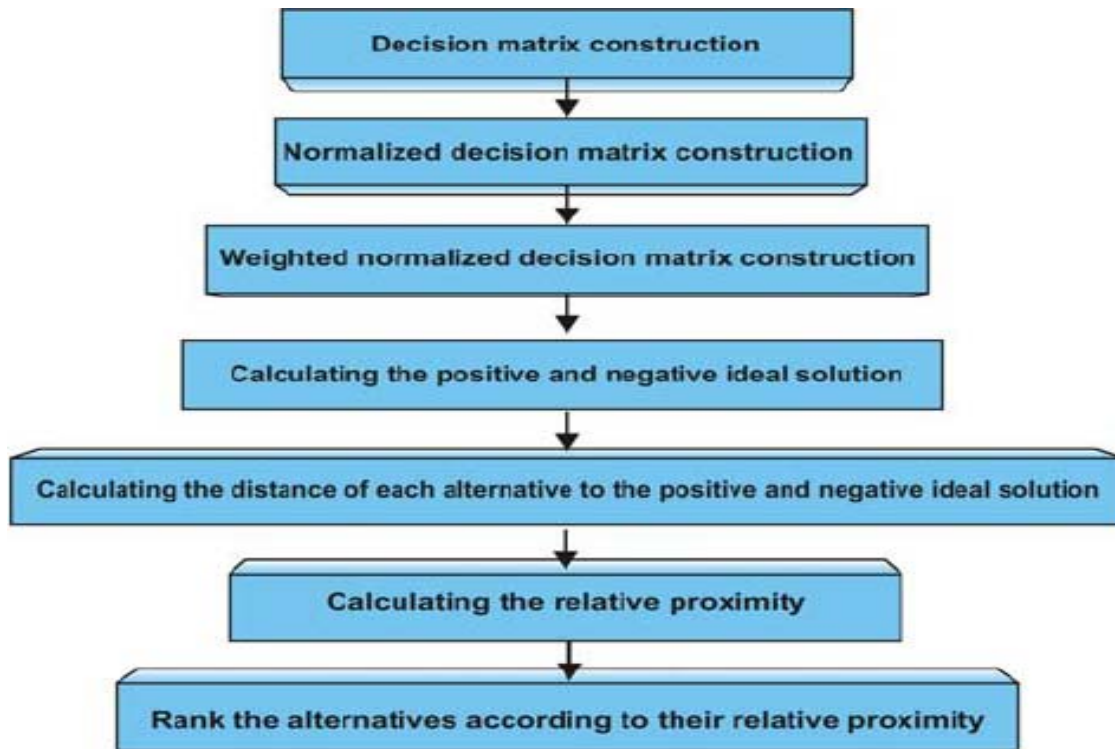


Figure v TOPSIS Algorithm

Input to TOPSIS

TOPSIS considers m number of options to select from and n factors to base the selection on and one must score each option against the corresponding factors.

Assume x_{ij} score of option i with respect to factor j , a matrix $X = (x_{ij})$ $m \times n$ matrix is formed. J is the set of positive attributes (the more, the better) and J' is the set of negative attributes (the less, the better). Each factor can be scored certain points on a scale of 0-10 or 0-100 by the experts (Assari et al., 2012).

Steps of TOPSIS (Zavadskas et al. 2006)

“Step 1: Develop a normalized decision matrix.

This step turns several attribute dimensions into dimensionless attributes, which permits comparisons across factors.

The weights or scores can be normalized as follows:

$$r_{ij} = x_{ij} / (\sum x_{ij}^2)^{\frac{1}{2}} \text{ for } i = 1 \dots m; j = 1, \dots, n$$

Step 2: Develop the weighted normalized decision matrix.

Assuming a set of weights for each attribute w_j for $j = 1 \dots n$. Individual column of the normalized decision matrix is multiplied by its associated weight.

An element of the new matrix becomes:

$$v_{ij} = w_j r_{ij}$$

Step 3: Determine the ideal and negative ideal solutions.

- Ideal alternative.

$$A^* = \{v_1^* \dots v_n^*\}, \text{ where}$$

$$v_j^* = \{ \max (v_{ij}) \text{ if } j \in J; \min (v_{ij}) \text{ if } j \in J' \}$$

- Negative ideal solution.

$$A' = \{v_1' \dots v_n'\}, \text{ where}$$

$$v_j' = \{ \max (v_{ij}) \text{ if } j \in J'; \min (v_{ij}) \text{ if } j \in J \}$$

Step 4: Compute the separation measures for each alternative.

The separation from the ideal alternative is:

$$S_i^* = \left[\sum (v_j^* - v_{ij})^2 \right]^{\frac{1}{2}} \quad i = 1, \dots, m$$

In the same way, the separation from the negative ideal alternative is:

$$S'_i = \left[\sum (v'_j - v_{ij})^2 \right]^{\frac{1}{2}} \quad i = 1, \dots, m$$

Step 5: Compute the relative closeness to the ideal alternative C_i^*

$$C_i^* = S'_i / (S_i^* + S'_i), 0 < C_i^* < 1$$

Choose the option with C_i^* closest to 1.

Step 6: Rank the preference order. “

Alternatives

Applying TOPSIS to this present work; $m = 3$ alternatives/options (The LPIs for Nigeria, Ghana and Morocco).

Criteria

The broad criteria for the comparison and analysis included: Main input of a supply chain and Service Delivery Performance Outcomes. Under the main input of a supply chain criterion, a sub-criterion will include: Customs, Infrastructure, and Quality of Logistics Services. The Service Delivery Performance Outcomes criterion will be sub-divided into: “Timeliness, International Shipments, and Tracking and tracing”. The flow algorithm the decision criteria are shown in figure vi.

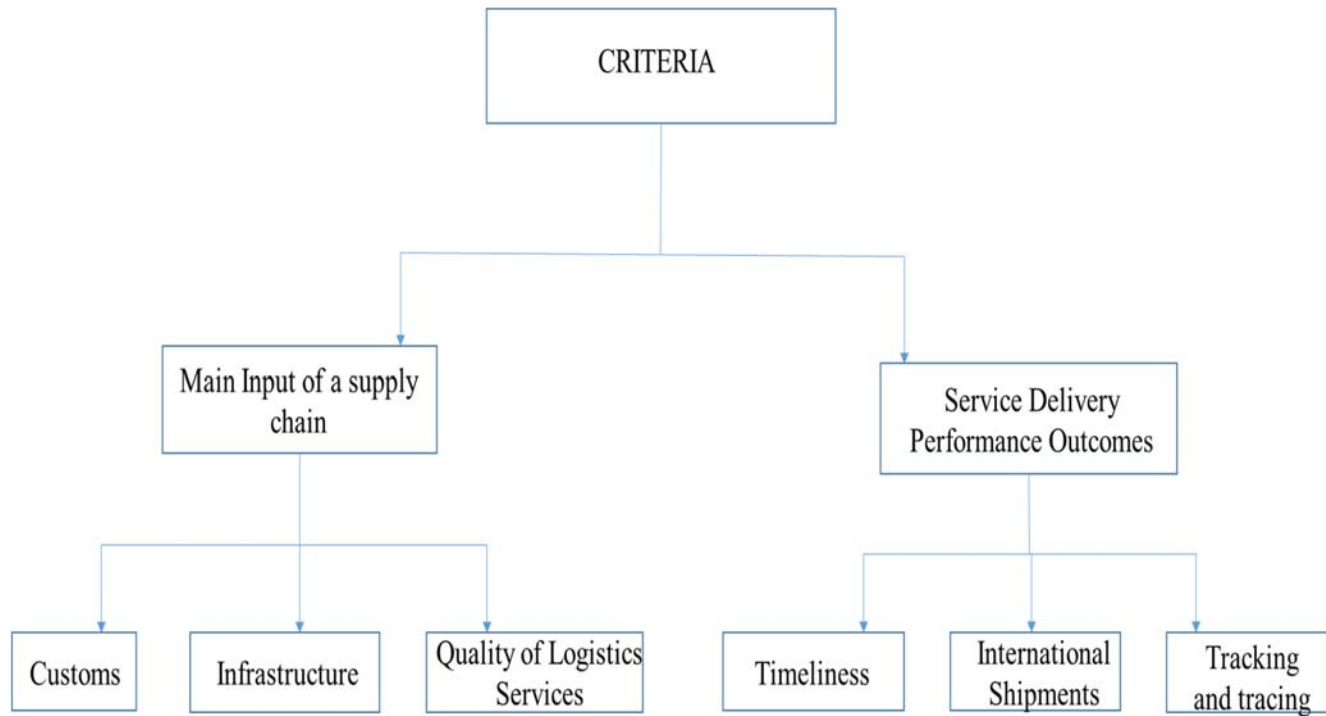


Figure vi TOPSIS Decision Criteria Flowchart

The tables/matrices for the analyses are developed in chapter 6.

4.6 World Bank Logistics Performance Index Techniques and Strategy focusing on Africa

In 2007, the World Bank began LPI as an approach to gauge the logistics performance of nations around the globe. The index depends on a study did on organizations that moves products crosswise over nations. It comprises of six principle parts; traditions, infrastructure, simplicity of masterminding shipments, nature of logistics administrations, following and following and practicality. LPI is viewed as the most appropriate approach to quantify a nation's logistics performance (D'Aleo and Sergi, 2017). LPI parts are confirmed by hypothetical and exact research, notwithstanding the conclusion of specialists in the field of universal cargo sending.

These parts are under the umbrella of two fundamental classes. In the first place, regions for strategy guidelines (the primary contribution of an inventory network) which incorporates traditions, infrastructure, and nature of logistics administrations. Second, administration conveyance performance results (time, cost, and dependability) which incorporates practicality, universal shipments, and following and following (Arvis et al., 2016). The LPI score runs between 1 (least) and 5 (most noteworthy). This is connected for the general score and its six segments specifically; traditions (proficiency of the freedom procedure), infrastructure (nature of trade and transport infrastructure), simplicity of organizing shipments (simplicity of masterminding aggressively evaluated shipments), nature of logistics administrations (fitness and nature of logistics administrations), following and following (capacity to track and follow transfers) and (practicality of shipments in arriving at their goal) (Ben and Shintaro, 2015).

Giving bits of knowledge about the connections between LPI factors help increment the competitiveness of a nation. What is more, it will enable governments to all the more likely comprehend the effect of their interests in logistics performance on financial development and empower the different governments to make remedial move with respect to their

interest in logistics performance so as to improve exports, subsequently prompting a progressively steady monetary development. The World Bank LPI system "investigates the connection among exports and logistics performance which will help in affecting the trade in African nations".

4.7 Ethical Issues

The market-sensitive information utilized in this investigation is either estimated or indexed in honoring the source's privacy. To manage against concealment or potentially deception, the sensitive information is indexed. In spite of the fact that the exploration is finished with help from staff of a portion of the organizations, no piece of the work or its result extends to any of the firms' plan. Endeavors were made to guarantee that the work is finished within its pertinence, at ideal cost and yielding the greatest effect.

CHAPTER FIVE

QUANTIFICATION OF VARIABLES

The Logistics Performance Index in general scores reflects the view of a nation's arrangement performance bolstered by the power of the traditions leeway technique, the nature of trade, transport-related infrastructure, simple interpretation aggressively estimated worldwide shipments, the nature of arrangement administrations, the capacity to follow and follow dispatches, and the recurrence with shipments arriving at the beneficiary at interims and planned timings. The index ranges from one to five, with higher scores speaking to a better performance. Since logistics has numerous measurements, estimating and outlining performance crosswise over nations is testing. Analyzing the time and costs identified with supply forms (port procedure, traditions freedom, transport, and along these lines the like) is a not too bad start, and in a few cases this information is immediately advertised. Nevertheless, even once complete, this information cannot be just aggregative into one, predictable cross-country dataset, inferable from basic varieties in the nations' offer chains. Much increasingly significant, numerous basic components of good logistics, for example, process straightforwardness and administration quality, consistency, and unwavering quality. This cannot be evaluated utilizing just time and cost data.

5.1 Logistics Performance Index of Ghana

Ghana logistics performance in 2007 was very poor in where ranked 125th out of 160 countries with a LPI score of 2.16. However, over the years, Ghana's logistics performance has improved in the various logistics components, where they have moved from 125th position to 88th position in 2016. Their LPI score also increased to 2.66 with great improvements in Customs, which moved from 2.0 in 2007 to 2.46 in 2016, Logistics Competence increased from 1.75 in 2007 to 2.54 in 2016. Ghana also improved in timeliness of delivery from 2.5 in 2007 to 3.21 in 2016. However, their performance

dropped in the 2018 Performance Index in which they moved from 88th position to 106th position and their scores in all the LPI components also significantly dropped. This indicates that, despite their logistics performance improvement from 2007 to 2016, their performances are now beginning to become drastically reduce (see table 2).

Table 2 Logistics Performance Index of Ghana (2007-2018)

Year	LPI Rank	LPI Score	Customs	Infrastruct ure	Internatio nal Shipment	Logistics Competen ce	Tracking & Tracing	Timeliness
2007	125	2.16	2	2.25	2.25	1.75	2.25	2.5
2010	117	2.47	2.35	2.52	2.38	2.42	2.51	2.67
2012	108	2.51	2.33	2.05	2.81	2.68	2.31	2.76
2014	100	2.63	2.22	2.67	2.73	2.37	2.9	2.86
2016	88	2.66	2.46	2.48	2.71	2.54	2.52	3.21
2018	106	2.57	2.45	2.44	2.53	2.51	2.57	2.87

Source: Connecting to compete (World Bank)

5.2 Logistics Performance Index of Nigeria

Based on the study of Nigeria's LPI from 2007 to 2018, Nigeria's logistics performance can be said to be unstable. They moved from 93rd position in 2007 to 121st position in 2012, then 75th in 2014 and 110th position in 2018. Their highest rankings are from the logistic component 'Timeliness', while the lowest rankings are from 'Customs'. Their Logistics Competence rating increased from 2007 to 2016 but has greatly dropped in 2018 (see table 5.2). Their performances in Infrastructure, Tracking & Tracing and International Shipments have increased over the years, though by small margin. There is need for the country to work towards improving their logistics performance in all the components, most specially in the Customs and Infrastructure, in order to be able to effectively trade in the International Market.

Table 3 Logistics Performance Index of Nigeria (2007-2018)

Year	LPI Rank	LPI Score	Customs	Infrastruct ure	Internatio nal Shipment	Logistics Competen ce	Tracking & Tracing	Timeliness
2007	93	2.4	2.23	2.23	2.49	2.38	2.36	2.69
2010	100	2.59	2.17	2.43	2.84	2.45	2.45	3.1
2012	121	2.45	1.97	2.27	2.6	2.52	2.35	2.92
2014	75	2.81	2.35	2.56	2.63	2.7	316	3.46
2016	90	2.63	2.46	2.4	2.43	2.74	2.7	3.04
2018	110	2.53	1.97	2.56	2.52	2.4	2.68	3.07

Source: Connecting to Compete (World Bank)

5.3 Logistics Performance Index of Morocco

Even though their ranking has dropped significantly from 94th in 2007 to 109th in 2018, their logistics performances in the different components have improved. Their best performance, however, was in 2012 where they ranked 50th globally and their LPI score was 3.03. In 2012, the performance of Customs increased from 2.2 in 2007 to 2.64, Infrastructure increased from 2.33 to 3.14, International Shipments increased from 2.75 to 3.01, Tracking & Tracing increased from 2.0 to 3.01, Timeliness increased from 2.86 to 3.51 and their Logistics Competence also improved.

However, after 2012, their logistics performance decreased in 2016 and even got worse in 2018 when they ranked 109th position globally with a LPI score of 2.54 (see table 5.3). This indicates the need for Morocco to go back to whatever they did in 2012 or come up with new ideas to improve their performance, in order to prevent further decrease in their LPI.

Table 4 Logistics Performance Index of Morocco (2007-2018)

Year	LPI Rank	LPI Score	Customs	Infrastructure	International Shipment	Logistics Competence	Tracking & Tracing	Timeliness
2007	94	2.38	2.2	2.33	2.75	2.12	2	2.86
2012	50	3.03	2.64	3.14	3.01	2.89	3.01	3.51
2016	86	2.67	2.22	2.46	3.09	2.59	2.34	3.2
2018	109	2.54	2.33	2.43	2.58	2.49	2.51	2.88

Source: Connecting to Compete (World Bank)

Table 5 shows how the case study countries compare with other regions.

Table 5 Comparison of Morocco's LPI with Other Regions (2018)

Regions	LPI Score	Customs	Infrastructure	International Shipments	Logistics Competence	Tracking & Tracing	Timeliness
Europe & Central Asia	3.24	3.04	3.13	3.14	3.21	3.27	3.65
East Asia & Pacific	3.15	3.01	3.05	3.03	3.13	3.18	3.49
Middle East & North Africa	2.78	2.54	2.76	2.73	2.68	2.79	3.19
Latin America & Caribbean	2.66	2.47	2.47	2.69	2.59	2.68	3.05
Morocco	2.54	2.33	2.43	2.58	2.49	2.51	2.88
South Asia	2.51	2.32	2.33	2.48	2.45	2.56	2.9
Sub-Saharan Africa	2.45	2.27	2.2	2.52	2.39	2.5	2.77

Source: Connecting to Compete (World Bank)

Table 6 Comparison of Nigeria's LPI with Other Regions (2018)

Regions	LPI Score	Customs	Infrastructure	International Shipments	Logistics Competence	Tracking & Tracing	Timeliness
Europe & Central Asia	3.24	3.04	3.13	3.14	3.21	3.27	3.65
East Asia & Pacific	3.15	3.01	3.05	3.03	3.13	3.18	3.49
Middle East & North Africa	2.78	2.54	2.76	2.73	2.68	2.79	3.19
Latin America & Caribbean	2.66	2.47	2.47	2.69	2.59	2.68	3.05
Nigeria	2.53	1.97	2.56	2.52	2.4	2.68	3.07
South Asia	2.51	2.32	2.33	2.48	2.45	2.56	2.9
Sub-Saharan Africa	2.45	2.27	2.2	2.52	2.39	2.5	2.77

Source: Connecting to Compete (World Bank)

Table 7 Comparison of Ghana's LPI with Other Regions (2018)

Regions	LPI Score	Customs	Infrastructure	International Shipments	Logistics Competence	Tracking & Tracing	Timeliness
Europe & Central Asia	3.24	3.04	3.13	3.14	3.21	3.27	3.65
East Asia & Pacific	3.15	3.01	3.05	3.03	3.13	3.18	3.49

Middle East & North Africa	2.78	2.54	2.76	2.73	2.68	2.79	3.19
Latin America & Caribbean	2.66	2.47	2.47	2.69	2.59	2.68	3.05
Ghana	2.57	2.45	2.44	2.53	2.51	2.57	2.87
South Asia	2.51	2.32	2.33	2.48	2.45	2.56	2.9
Sub-Saharan Africa	2.45	2.27	2.2	2.52	2.39	2.5	2.77

Source: Connecting to Compete (World Bank)

Table 8 LPI of Ghana, Nigeria and Morocco in Global Ranking across 160 Countries (2018)

Country	LPI Rank	LPI Score	Customs	Infrastruct ure	Internatio nal Shipment	Logistics Competen ce	Tracking & Tracing	Timeliness
Ghana	106	2.57	2.45	2.44	2.53	2.51	2.57	2.87
Morocco	109	2.54	2.33	2.43	2.58	2.49	2.51	2.88
Nigeria	110	2.53	1.97	2.56	2.52	2.4	2.68	3.07

Source: Connecting to Compete (World Bank)

Aggregated Logistics Performance Index (2012- 2018)

Aggregated LPI combines the four most recent LPI editions. Scores of the six components were used to generate a "big picture" to better indicate countries' logistics performance.

The aggregated LPI allows for comparisons across 167 countries.

Table 9 Aggregated Logistics Performance Index (2012-2018)

Country	LPI Rank	LPI Score	Customs	Infrastruct ure	Internatio nal Shipment	Logistics Competen ce	Tracking & Tracing	Timeliness
Morocco	87	2.67	2.36	2.58	2.8	2.59	2.84	3.03
Ghana	101	2.6	2.41	2.46	2.63	2.51	2.58	2.95
Nigeria	103	2.59	2.15	2.5	2.52	2.54	2.73	3.1

Source: Connecting to Compete (World Bank)

Table 10 Linear Shipping Connectivity Index (2007-2018)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Morocco	13.33	29.69	36.72	48.81	47.66	50.26	51.08	57.52	57.83	61.74	63.68	65.04
Ghana	18.62	19.06	19.46	21.68	22.3	20.86	21.58	22.73	23.06	20.23	20.54	20.14
Nigeria	18.4	20.23	19.87	22.29	21.64	22.16	22.7	23.96	25.34	23.09	22.59	20.5

Source: UNCTADSTAT

Table 11 Container Port Throughput TEU (2010-2017)

Year	2010	2011	2012	2013	2014	2015	2016	2017
Morocco	2 800 000	3 033 000	2 964 820	3 526 200	4 075 000	3 965 000	3 979 000	4 570 000
Ghana	643 100	813 900	881 200	900 000	890 000	900 000	900 000	921 000
Nigeria	1 232 000	1 510 000	1 723 000	1 580 000	1 700 000	1 400 000	1 437 000	1 656 000

Source: UNCTADSTAT

Table 12 Comparison of Africa's Logistics Performance Against Other Regions

Regions	LPI Score	Customs	Infrastructu re	International Shipments	Logistics Competence	Tracking & Tracing	Timeliness
Europe & Central Asia	3.24	3.04	3.13	3.14	3.21	3.27	3.65
East Asia & Pacific	3.15	3.01	3.05	3.03	3.13	3.18	3.49
Middle East & North Africa	2.78	2.54	2.76	2.73	2.68	2.79	3.19
Latin America & Caribbean	2.66	2.47	2.47	2.69	2.59	2.68	3.05
South Asia	2.51	2.32	2.33	2.48	2.45	2.56	2.9

Sub-Saharan Africa	2.45	2.27	2.2	2.52	2.39	2.5	2.77
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Source: Connecting to compete (World Bank)

The ranking established by the index places the developed regions at the top while emerging nations occupy the lower positions. The regions with highest ranking are Europe & Central Asia with an LPI average of 3.24 and East Asia & Pacific Region with an LPI average of 3.15. These regions have large distribution platforms and industries specialized in logistics services, thus, they tend to benefit from economies of scale and are a source of major technological innovations.

As seen in table 12, it is obvious that Sub-Saharan African countries experience the lowest average LPI score in relation to their trading partner regions, particularly in terms of quality of trade and transport-related infrastructures, customs, competency and quality of logistics services. While the East and North African Region came 3rd place in the ranking, the larger number of African Countries constitutes the Sub-Saharan Region.

The results show there is a logistics gap between the developed and emerging nations that is difficult to overcome. It is interesting to note that none of African Countries, except South Africa, is among the top-20 best performers. Not only is the ranking of African countries low but the LPI scores on all the six assessments categories were also the lowest. Nevertheless, this index suggests the urgent need for policies aimed at improving logistics services in African countries combined with integrated system comprising improvement in Infrastructure and public and private services. Changes should not only focus on reducing costs and time, but should also make advances in the reliability of deliveries.

Table 13 Cost to export/import per TEU in Africa

Country	LPI	Customs	Infrastructu re	Quality of Logistics Services	Ease of Shipping	Tracking & Tracing	Timeliness t
Africa	Export	10.21	6.67	6.6	10.45	7.42	6.89
	Import	4.73	2.23	3.61	4.08	3.75	3.16

Source: Connecting to compete (World Bank)

On the whole, table 13 shows it is much cheaper to import than to export in major African countries. As a locale, Africa has the least fortunate in general trade logistics performance. Infrastructure inadequacies communicate with poor open organizations and the absence of rivalry among specialist organizations to make an endless loop of requirements to the effective development of merchandise and ventures. At the firm level, this converts into a considerable "export charge" on worth included. Without more noteworthy consideration and resources to bring down the expenses of exporting products, African nations will neglect to prevail with regards to contending with different locales of the world.

CHAPTER SIX

FINDINGS

Transport and logistics administrations encourage global trade and assume a significant job in the development and advancement of the nearby economy. The quality and productivity of logistics administrations can matter for universal trade as a frail logistics infrastructure and operational procedures can be a noteworthy snag to worldwide trade mix (Devlin and Yee, 2005). Despite what might be expected, an improved trade related logistics, joined with a changed financial condition, can expand trade volume and economies of scale and extension in conveyance and generation exercises (Lakshman et al., 2001).

6.1 Estimation Strategy

All inclusive, the size of the logistics division is not obviously known. Shepherd's (2011) examination of logistics information, covering 45 nations, uncovered that, by and large, the logistics part represents around 5 percent of the total national output (GDP), with a scope of 2 percent to 12 percent. Given the pace at which the world trade has been expanding since 2000 (noted underneath), the commitment of the logistics segment to the national yield in numerous nations is probably going to quicken as the pace of trade progression reinforces and nations become increasingly more outward situated. The nature of logistics performance can be checked from the World Bank information to give a humble sign of logistics performance crosswise over nations around the globe at various degrees of improvement. Logistics accomplishments contrast notably crosswise over the salary class of nations. There are huge holes in logistics performance between the high-pay bunch nations and the low and center pay gathering of nations. Arvis et al. (2012) with respect to the "logistics hole" between the high-salary nations contended that the vehicle and logistics GVCs in the creating nations, including the help for combination into different GVCs, still face exceptionally critical snags.

Logistics in the business setting and specifically, trade logistics, incorporate the scope of administrations and procedures that are associated with moving products securely and safely starting with one nation then onto the next. Merchandise crossing national fringes experience a scope of procedures that incorporate, yet are not restricted to, fulfilling traditions and regulatory techniques; compelling association and management of global shipment tasks; opportune following and following of shipments; and guaranteeing high caliber of vehicle and data innovation infrastructures (Korinek and Sourdin, 2011).

A significant part of the operational elements of a scope of these administrations in numerous nations are performed for the most part by the private division, with administrative and different types of institutional help from the legislature. The previously mentioned logistics practical territories are additionally connected to one another. Thus, the connected chain of procedures associated with moving contributions just as the completed merchandise from the makers to buyers inside residential economies crosswise over various fringes is necessary in encouraging global trade.

Existing investigations on logistics and trade commonly, will in general show reliable results and point to a general course that there is a positive connection between improved logistics and more trade. For instance, Arvis et al. (2007 and 2010) exhibited illustrative insights proposing a positive relationship between logistics performance and significant result markers, for example, trade transparency. Dee and Findlay (2006) in their review of writing on trade assistance demonstrated that infrastructure quality is related with huge increments in trade. A study by Dollar, Hallward-Driemeier, and Mengistae (2004), uncovered that organizations in nations exposed to better speculation atmosphere and logistics had a higher likelihood in expanding their exports. Saslavsky and Shepherd (2012) affirmed that logistics performance made a difference more for trade with GVCs than for different sorts of trade. Hoekman and Nicita's (2010) examination of LPI in a gravity model of trade uncovered a critical positive relationship between logistics performance and trade power.

These creators likewise noticed that the impact was quantitatively significant: expanding the normal low-salary nation's LPI score to the center pay normal would build trade by around 15 percent. Howl (2012) additionally joined gravity demonstrating structure to investigate grain trade among created and creating nations, uncovering separation (speaking to move costs) as a critical contact. In their examination, Hausman, Lee and Subramanian (2012) contended that logistics performance between two nations can be a huge determinant of complete landed expense. Ongoing examinations, for example, OECD (2013) and Portugal-Perez and Wilson (2012) found that trade assistance estimates expanded imports as well as helped exports through better access to contributions for generation and more prominent support in worldwide and territorial worth chains.

6.2 Examining and Analyzing the Trade Logistics Performance Index of Ghana, Nigeria and Morocco

In the Aggregated Logistics Performance Index which combines four most recent (2012-2018) LPI results of these countries, the scores of the six components were used to generate a "big picture" to better indicate each Country's logistics performance. According to this aggregated LPI, Morocco ranked 87th with LPI score of 2.67, Ghana 101st with LPI score of 2.6 and Nigeria 103rd with LPI score of 2.59. This, thus, indicates that Morocco takes the first position out of the three countries under consideration, closely followed by Ghana while Nigeria took the 3rd position. While Morocco takes the lead in all the components except one, Ghana takes the lead in Customs (Ghana 2.41, Morocco 2.36) which indicates that from 2012-2018, the aggregate performance of Customs in Ghana supersedes that of Morocco.

Nigeria on the other hand, with the 3rd position surpassed the performances of Ghana in Infrastructures (Nigeria 2.5, Ghana 2.46), Logistics Competence (Nigeria 2.54, Ghana 2.51), Tracking & Tracing (Nigeria 2.73, Ghana 2.58) and Timeliness (Nigeria 3.1, Ghana 2.95). Thus, the aggregate performance of Nigeria supersedes that of Ghana in these four components. However, in the 2018 Global Ranking of Countries' Logistics Performance

Index, Ghana took the lead out of the three countries under consideration for this study in 106th position and a LPI score of 2.57, followed by Morocco ranked in 109th position with a LPI score of 2.54, while Nigeria ranked 110th with a LPI score of 2.53; this was the lowest of the three countries. Even though Ghana's LPI score is higher than the other two countries, their performances in some of the components are quite lower to them. Morocco's rank in International Shipments (Morocco 2.58, Ghana 2.53) and Timeliness (Morocco 2.88, Ghana 2.87) is higher than that of Ghana which indicates that their performance in these components supersedes that of Ghana. Also, Nigeria with the lowest rank out of the three countries has the highest ranking in Infrastructure (Nigeria 2.56, Ghana 2.44, Morocco 2.43), Tracking & Tracing (Nigeria 2.68, Ghana 2.57, Morocco 2.51) and Timeliness (Nigeria 3.07, Morocco 2.88, Ghana 2.87) which indicates that despite being the lowest LPI ranking out of the three countries, it still functions effectively in Infrastructural development, Tracking & Tracing and Timeliness, much more than the other two countries.

6.2.1 Evaluating African Logistics Performance Index: How it weighs up against the LPIs of Ghana, Nigeria and Morocco

In the LPI ranking discussed above, according to the aggregated LPI, Morocco ranked 87th with the LPI score of 2.67, Ghana 101st with the LPI score of 2.6 and Nigeria 103rd with the LPI score of 2.59. This, thus, indicates that Morocco takes the first position out of the three countries under consideration, closely followed by Ghana while Nigeria takes the 3rd position.

However, in the consideration of the Liner Shipping Connectivity Index of these countries, Morocco, even though it started out with the lowest rating out of the three countries in 2007 (Morocco 13.33, Ghana 18.62, Nigeria 18.4), has however over the years, gone ahead to take the lead with the LSCI of 65.04 in 2018 compared to Ghana's 20.14 and Nigeria's 20.5.

While Morocco has actively improved upon its container shipping with a consistent increase in its connectivity, Ghana and Nigeria have remained backward in this regard. Morocco thus takes the lead both in the LPI ranking and LSCI ranking. Nigeria with the LSCI of 20.5 follows after Morocco 65.04, which shows the margin between the two is quite high and Nigeria is nowhere near the liner shipping connectivity of Morocco. Even though Ghana's LPI ranking is higher than Nigeria's, however, Nigeria's LSCI is higher than that of Ghana (Nigeria 20.5, Ghana 20.14), though with very little margin. Thus, in rating the countries, Morocco takes the 1st, Nigeria 2nd while Ghana takes the 3rd position. There is along these lines the requirement for both Ghana and Nigeria to effectively enhance the holder liner sending as the most significant type of moving products and a nation's entrance to world market depends to a great extent on their vehicle network, particularly as to ordinary transportation administrations for the import and export of fabricated merchandise. Sea transport is likewise the foundation of worldwide trade and a key motor driving globalization. Around 80% of worldwide trade by volume and over 70% by worth is conveyed via ocean and is dealt with by ports worldwide. Consequently, the significance of openness to ports, worldwide transporting and airship cargo systems to trade performance can't be undermined. In the rest of the piece of this segment, tasks were done through quantitative and qualitative examinations so as to:

Examine the 6 parameters of the World Bank LPI for the 3 countries in Africa.

- Based on a) verify, analyze and measure different effect of each of the 6 parameters on the country's import and export.
- Based on b) to suggest a differentiated "weighting" scheme for LPI (instead of the equal weight scheme).
- Based on c), re-rank the three countries, identify the most critical issues and make conclusion and recommendations.

The outcomes of these tasks constitute the rest of this section.

6.3 Respondents and Questionnaire Answers

Table 14 Component weights by Experts

w(C)	w(I)	w(S)	w(T)	w(TT)	w(IS)	Ksi*	
Average Weights by the respondents	0,159449	0,235406	0,216904	0,16013	0,102483	0,125628	0,119194

As seen in table 14, infrastructure and quality of services were the segments regularly viewed as the most significant rule. True to form these segments likewise have the most astounding weights in the wake of applying the mean of the appropriate responses given by the respondents. A portion of the weights by the specialists are generally reliable with what is in the writing. For example, Infrastructure was viewed as the most significant rule for logistics performance. The exploration found in the writing was just a little bit of the measure of concentrates accessible on the immediate impact of infrastructure on trade and logistics performance.

Consequently, it is not astonishing that infrastructure is viewed as the most significant standard. The equivalent goes for the segment administrations, in numerous inquiries about the nature of the organizations giving strategic administrations which were found to greatly affect the productivity of supply chains and along these lines on calculated performance. The specialists concurred on this and the weight of administrations is the second most astounding, just before the weight of the infrastructure.

Practicality was viewed as among the third most significant paradigm. This moderately high significance was supported up by the looks into Deardoff (2002) and Hummels (2001) that clarified the expanding significance of practicality and the impact on trade. Following and following was viewed as the least significant rule. Writing found on this part proposed it had impacts on client administration performance and could profit total supply chains. The low weight could likewise be clarified by the way that the meaning of

following and following is not clear (van Dorp, 2002). There was no examination connecting following and following with calculated performance or trade effectiveness. When all is said and done, the weights and the writing observed for the writing is by all accounts steady.

Utilizing the outcomes on the six distinct segments an important segment investigation is utilized to decide the LPI of a nation. The Head segment investigation (PCA) is a measurable examination strategy used to decrease dimensionality and discover article designs (Wold et al., 1987). In the LPI case, the information sources are the standardized midpoints of the scores given by specialists on the six center parts. A weighted LPI is the result of the investigation. The weights anyway are not founded on the significance of the segments but rather are chosen to boost the level of variety that is represented by the LPI. Table 2 demonstrates the weights of the various segments used to compute the LPI. The PCA has been revamped for everything about LPI reports throughout the years, however the weights have stayed nearly equivalent, making the diverse variant tantamount to one another (Arvis et al., 2016).

Table 15 Component weights by World Bank

<i>Component</i>	<i>Weight</i>
Customs	0.41
Timeliness	0.40
Tracking and tracing	0.41
Infrastructure	0.41
International shipments	0.41
Services quality	0.41

The weights are rated on a scale of 0-1 by World Bank, with 0 implying that the component is not important and 1 implies that the component is extremely important. Since the weights are on the whole extremely near one another, the LPI is just about a normal of the score on the six parts. As referenced before in the work, this appears to be exceptionally impossible in the intricate framework that universal logistics is.

Consequently, doling out weights can be an improvement of the LPI and was a piece of the objectives of this examination. This was finished utilizing a technique for Multi Criteria Decision making. This exploration planned for appointing weights to these parts not founded on finding the best basic clarification (as finished with PCA) yet dependent on their relative significance to one another. The measurements of the respondents and their assessment of the LPI segments are demonstrated as follows:

Table 16 Respondent Statistics

Approached experts	10
Total respondents	10
Uncompleted	0
Excluded	0
Response rate	100%

A few ends can be drawn from table 16. Infrastructure is chosen by 4 out of the aggregate of 10 respondents, trailed by administrations with 3 respondents. Following and Tracing is just part regarded not to be the most significant by every one of the respondents. The simple of organizing aggressively costs shipments is just considered the most significant by one master. At any rate, every one of the segments yet Tracking and Tracing have at any rate been named as most significant, making it all around likely that they are at any rate a significant factor in logistics performance. This likewise suggests 100% of the specialists concurred that the Tracking and Tracing part is the least significant segment of Logistics Performance Index. It is evident that infrastructure and administrations are viewed as the elements driving calculated performance, while following and following is the least significant criteria.

Figures 7 and 8 demonstrate the quantity of specialists and how they evaluated the significance of every one of the LPI segments.



Figure vii Number of Experts vs Most Important LPI Component Rating

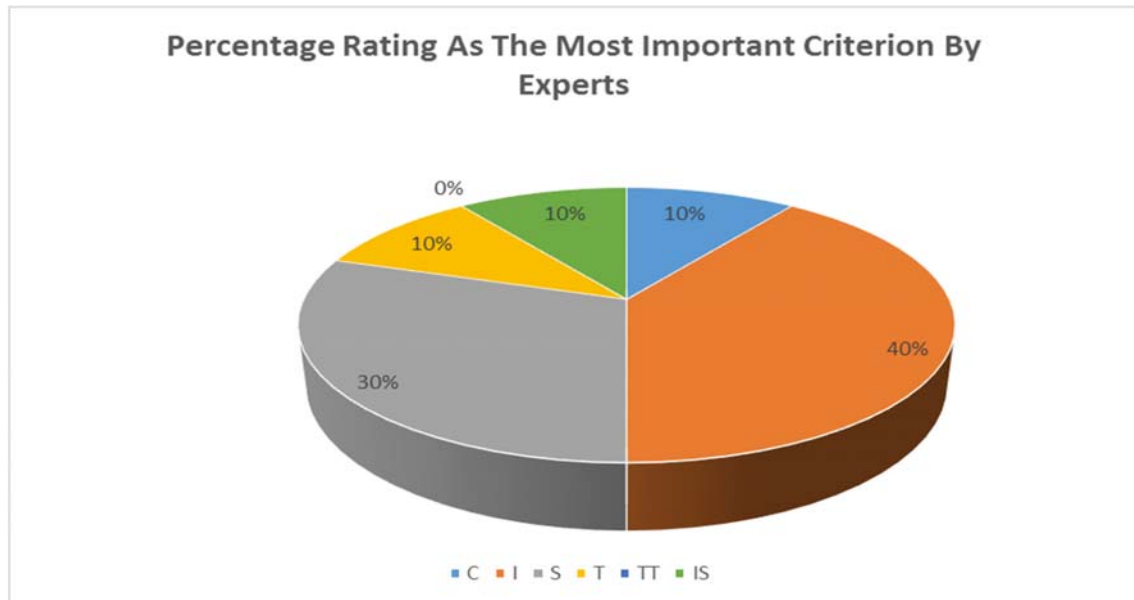


Figure viii Percentage Rating of Specific Components by Experts

From the investigations of the master's reactions to our survey, certain parts were found which the World Bank has never considered.

6.3.1 Segments not presently considered in LPI

Maybe a couple of the specialists clarified through email that because of the environmental change the world is as of now encountering and the expanded mindfulness for nature, shows changes have been made in numerous segments to diminish discharges and become increasingly ecological cordial. These patterns are additionally obvious in the transportation and delivery segment, which impacts emissions worldwide. Sea transport is in charge of 2.5% of the worldwide ozone harming substance discharges in 2014. The desire is that these emanations will have expanded with somewhere in the range of half and 250% in 2050 (International Maritime Organization, 2014).

As a response to these normal outcomes, numerous standards and rules for the transportation segment have been proposed worldwide. The International Maritime

Organization has proposed various measures to diminish shipping emanations with up to 75%. Accordingly, the environment ought to be a factor in logistics and in this manner could be a part of the LPI. In the current LPI nature is not considered as one of the key parts. In any case, it recognizes that condition is be-coming an increasingly significant factor.

Some specialists additionally expressed that Innovation ought to be a significant factor in logistics performance. Development is fundamental in all areas to continue improving performance. There are several conceivable outcomes for advancement, for example, new innovations, new procedures, or better collaboration potential outcomes. Advancements can prompt a superior logistics performance. Apparently development positively affects different parts. All things considered, nations that are increasingly imaginative will receive new advances faster and better, and in this manner score higher on, for instance, the components of infrastructure and following.

6.3.2 Weighted LPI positioning

The specialists who reacted to our study, demonstrated by telephone through their individual contact that they based their reactions between 2016-2017 encounters. In this way, to be in agreement with the World Bank LPI, we utilized the 2016 LPI measurements for the weighted LPI positioning and correlation.

Table 17 w-LPI Ranking

				C	I	IS	S	TT	T				
				0,159	0,235	0,26	0,21	0,10	0,160				
					4		7	2	1				
Rank	Country	LPI score	w-LPI	score	score	score	score	score	score	LPI rank	Rank diff	% diff	
85	Ghana	2,667	2,640	2,46	2,48	2,71	2,54	2,52	3,21	88	3	-	0,7919
												0.792	

86	Morocco	2,666	2,634	2,22	2,46	3,09	2,59	2,34	3,20	86	0	-1,19	1,1902
87	Nigeria	2,628	2,619	2,46	2,40	2,43	2,74	2,70	3,04	90	3	-0,343	0,3428

6.3.3 Statistics and Comparison

Taking a gander at the LPI and w-LPI positioning, the primary item that stands out is that both the positioning and the score appear to be fundamentally the same as for the three nations. Morocco's position stayed at 86, Nigeria dropped from 87th to 90th, while Ghana likewise dropped from 85 to 88. The contrasts between the two rankings and scores are little. The little contrasts between the LPI and the w-LPI positioning additionally appeared in figure 6.3 beneath where the level pivot speaks to the LPI score and the vertical hub the w-LPI score. The relapse between the two scores was 0.9346. This implies the score of the w-LPI can be anticipated impeccably from the LPI score utilizing the relationship beneath:

$$W - LPI = 1.3829 + 0.4703 LPI \dots \dots \dots 6.1$$

This correlation was developed from the outcome of the regression analysis using Microsoft Excel Data analysis toolpak (see table 18)

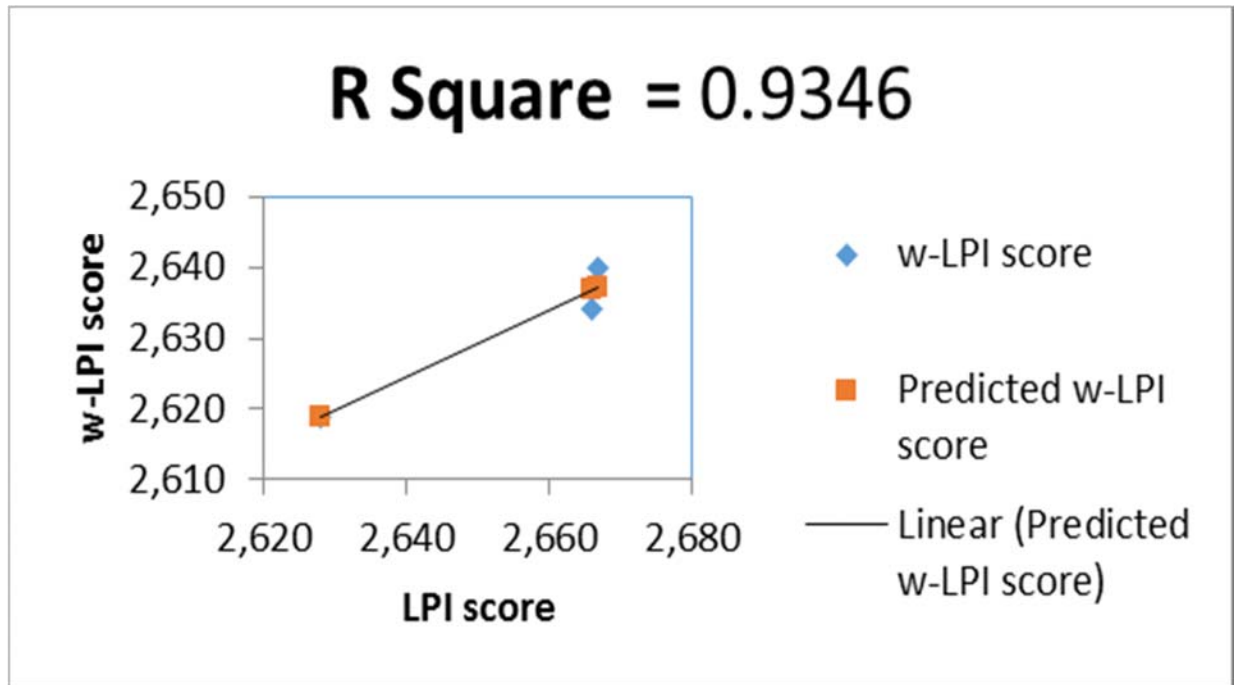


Figure ix LPI and w-LPI correlation

Table 18 Summary Output: w-LPI and LPI Correlation

Regression Statistics	
	0.9667631
Multiple R	28
	0.9346309
R Square	46
	0.8692618
Adjusted R Square	91
	0.0039110
Standard Error	56

Observations	3
--------------	---

ANOVA

	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.000218704	0.0002187	14.29776	0.1645945
Residual	1	1.52964E-05	1.53E-05		
Total	2	0.000234			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>
Intercept	1.382899865	0.330084868	4.189528	0.149164	2.811226046
LPI score	0.470330411	0.124385307	3.781238	0.164595	1.110134772

RESIDUAL OUTPUT

<i>Observation</i>	<i>Predicted w-LPI score</i>	<i>Residuals</i>
1	2.637271072	0.002728928
2	2.6368007	-

	42	0.0028007
		42
	2.6189281	7.18139E-
3	86	05

Figure ix shows that there are no countries for which the score differs significantly from the trend line. This means that there are no exceptions to the fact that for the correlation between the LPI and the w-LPI for each country, the w-LPI score could be predicted almost perfectly from the LPI score since they all have a correlation close to 1.

From this examination, it tends to be seen that the weights for the six center parts are fundamentally unique in relation to one another, implying that not every one of the segments are similarly significant when estimating logistics performance. Despite the fact that the segments are not similarly significant, evidently this does not impact the positioning enough to have a genuine effect. That the positioning does not vary much from the LPI positioning does not imply that the weights do not educate anything concerning the significance of various factors in logistics performance estimating.

6.3.4 LPI and w-LPI connection

The past area distinguished the high connection between the LPI and the w-LPI score, despite the fact that the weights for the six center segments are fundamentally extraordinary.

The high relationship between the LPI and the w-LPI even with the noteworthy contrast in weights, proposes that there is a connection between the scores on the various segments. A high connection between the scores on two parts would imply that if a nation scores high on a specific segment it will likewise score high on other segments. On the off chance that the connection between everything of the parts is high would imply that the LPI score could be anticipated by simply taking a gander at the scores on one of the segments. This would likewise imply that appointing weights to the components will not influence the positioning much. On the off chance that the relationship between the various parts would be low, the distinctions in positioning for a nation on every one of the segments would be higher and relegating weights will highly affect the w-LPI score and along these lines a higher impact on the positioning. The table below demonstrates the connection between the LPI score, the w-LPI scores and the components:

Customs (C), Infrastructure (I), International shipments (IS), Services (S), tracking & tracing (TT), and timeliness (T).

Table 19 Summary Output- LPI and components

<i>Regression Statistics</i>	
Multiple R	1
R Square	1
Adjusted R Square	65535

Standard Error	0
Observations	3
ANOVA	
	<i>Df</i>
Regression	6
Residual	0
Total	6
	<i>Coefficients</i>
Intercept	3.040461111
C	0
I	0
IS	0.019444444
S	-0.167777778
TT	0
T	0

As seen in table 19, the correlation between LPI and the components after the weighting is as shown in equation 6.2:

$$LPI = 3.04 + 0.019IS - 0.168S \dots \dots \dots 6.2$$

While w-LPI and the components is given as:

Table 20 Summary Output- w-LPI and the components

<i>Regression Statistics</i>	
Multiple R	1
R Square	1
Adjusted R Square	65535
Standard Error	0
Observations	3
ANOVA	
	<i>Df</i>
Regression	7
Residual	0
Total	7
<i>Coefficients</i>	
Intercept	2.917143333
LPI	0
C	0
I	0
IS	-0.00166667
S	-0.10733333
TT	0
T	0

$$w_{LPI} = 2.92 - 0.0017IS - 0.1073S \dots \dots \dots 6.3$$

Equations 6.2 and 6.3 show that the weighting has completely made the effect of custom, infrastructure, Tracking and Tracing, and Timeliness completely insignificant on LPI.

For both correlations, the regression is exactly 1, implying a very high correlation between the variables.

To remove the effects of bias in component weighting, the LPIs of the three case study countries were critically analyzed using TOPSIS as shown:

6.3.5 TOPSIS Comparative Analysis of the LPIs of Ghana, Nigeria and Morocco

Applying TOPSIS to this present work; $m = 3$ alternatives/options (Nigeria, Ghana and Morocco) and $n = 6$ attributes/criteria including the customs, infrastructure, services, timeliness, tracking and tracing, and international shipments. w_j = set of weights for each criteria (averaged for the experts and World Bank ratings) as shown in table 6.8. x_{ij} = score of option i with respect to criterion j as shown in table 6.9.

The normalized decision matrix $r_{ij} = x_{ij}/(\sum x_{ij}^2)^{\frac{1}{2}}$ as shown in table 6.10. The weighted normalized decision matrix $v_{ij} = w_j r_{ij}$ is developed by multiplying each column of the normalized decision matrix by its associated weight.

A set of maximum values for each criteria also known as the ideal solution $A^* = \{v_1^* \dots v_n^*\}$ is developed as shown under step 3 below. Similarly, a set of minimum values for each criteria also known as the Negative ideal solution $A' = \{v_1' \dots v_n'\}$ is developed as shown in step 3.

The separation from the ideal alternative is, $S_i^* = \left[\sum (v_j^* - v_{ij})^2 \right]^{\frac{1}{2}}$ is computed.

Similarly, the separation from the negative ideal solution, $S_i' = \left[\sum (v_j' - v_{ij})^2 \right]^{\frac{1}{2}}$ is also computed. Finally, the relative closeness to the ideal solution $C_i^* = S_i' / (S_i^* + S_i')$ is computed and the results are as shown in table 25.

Applying TOPSIS in the analysis results to:

Table 21 shows the weights assigned to each of the criterion (by the experts) on a scale of 0-1 based on their importance to the analysis.

Table 21 Assigned Weights to the Criteria

CRITERIA	WEIGHT	RATING SCALE
Customs (C)	0.159	Scale of 1 (1 means very important, 0 means not important)
Infrastructure (I)	0.2354	
International Shipments (IS)	0.126	
Services (S)	0.217	
Tracking and Tracing	0.102	
Timeliness	0.162	

Table 22 x_{ij} = score of option I with respect to criterion j

CRITERIA	Nigeria	Ghana	Morocco	RATING SCALE
Customs (C)	2.46	2.46	2.22	Scale of 5 (5 means excellent, 1 means very poor)
Infrastructure (I)	2.40	2.48	2.46	
International Shipments (IS)	2.43	2.71	3.09	
Services (S)	2.74	2.54	2.59	
Tracking and Tracing	2.70	2.52	2.34	
Timeliness	3.04	3.21	3.20	

Step 1: Standardizing the decision matrix

This step makes the ratings dimensionless by dividing each column of the decision matrix by root of sum of square of respective rows. The result of this is shown in table 23:

Table 23 The normalized decision matrix $r_{ij} = x_{ij} / (\sum x_{ij}^2)^{\frac{1}{2}}$

CRITERIA	NIGERIA	GHANA	MOROCCO
Customs (C)	0.596083887	0.596083887	0.537929362
Infrastructure (I)	0.566283484	0.585159601	0.580440572
International Shipments (IS)	0.508939866	0.567583143	0.647170447
Services (S)	0.602710408	0.558716947	0.569715312
Tracking and Tracing	0.617540227	0.576370879	0.53520153
Timeliness	0.557018575	0.58816764	0.586335342

Step 2: Develop weighted standardized decision matrix by multiplying the criteria weight with each rating as seen in table 23. The weighted standardized decision matrix is presented in table 24:

Table 24 *The weighted normalized decision matrix $v_{ij} = w_j r_{ij}$*

CRITERIA	NIGERIA	GHANA	MOROCCO
Customs (C)	0.094777338	0.094777338	0.085530769
Infrastructure (I)	0.133303132	0.13774657	0.136635711
International Shipments (IS)	0.064126423	0.071515476	0.081543476
Services (S)	0.130788158	0.121241578	0.123628223
Tracking and Tracing	0.062989103	0.05878983	0.054590556
Timeliness	0.090237009	0.095283158	0.094986325

Step 3: Determine ideal alternative and negative ideal alternative

A set of maximum values for each criteria is the ideal alternative while a set of minimum values for each criteria is the negative ideal alternative.

Ideal alternative A*: {0.094777338, 0.13774657, 0.081543476, 0.130788158, 0.062989103, 0.095283158}

Negative ideal alternative A': {0.085530769, 0.133303132, 0.064126423, 0.121241578, 0.054590556, 0.090237009}

Step 4 (a): Determine separation S_i^* from ideal solution (A*).

$$S_i^* = \left[\sum (v_j^* - v_{ij})^2 \right]^{\frac{1}{2}} = \{0.018669801, 0.014468306, 0.014443733\}$$

Step 4 (b): find separation from negative ideal solution (A')

$$S'_i = \left[\sum (v'_j - v_{ij})^2 \right]^{\frac{1}{2}} = \{0.015721699, 0.01424566, 0.01851248\}$$

Step 5: Calculate the relative closeness to the ideal solution $C_i^* = S'_i / (S_i^* + S'_i)$

Table 25 *Computation and results of the relative closeness to the ideal solution $C_i^* = S'_i / (S_i^* + S'_i)$*

	NIGERIA	GHANA	MOROCCO
Si*	0.018669801	0.01446831	0.014443733
Si'	0.015721699	0.01424566	0.01851248
Si*+Si'	0.034391501	0.02871397	0.032956213
Si'/(Si*+Si')	0.457139089	0.49612303	0.561729589

Therefore, the country with the best logistics performance considering the six components of LPI which include: customs, infrastructure, services, timeliness, tracking and tracing, and international ships; having performed all the TOPSIS steps over these 6 criteria is **Morocco** which scored 0.561, which is the perfect value of relative closeness to the ideal solution of 1 in this study.

From the TOPSIS analysis, the second best country with respect to logistics performance is Ghana, with a value of 0.496. Nigeria scored the least with a score of 0.457.

In this analysis, great importance was placed more on the infrastructure, followed by services by the experts. Factors like timeliness have the least importance, and therefore the lowest weight was assigned to it.

Lastly, in this section, the relationship between the LPI and the Liner Shipping Connectivity Index has also been compared for their similarities and differences.

The Liner Shipping Connectivity Index (LSCI) is an index made by the United Nations Conference on Trade and Development (UNCTAD). It is an index that demonstrates how well a nation lies in the transportation arrangement. The point of the report is to demonstrate how a nation can improve its entrance to the worldwide trade markets. A high positioning in the index implies that a nation has simple access to this system and is probably going to have a well-created economy and exchanging framework (Hoffmann and Fuguzza, 2015). At the point when the index was displayed it was an examination of the availability beginning in 2004. To do these five distinct parameters were made as shown.

Table 26 LSCI Parameters

Parameter	Explanation (Hoffmann & Fuguzza, 2015)
Fleet deployment	The quantity of boats that are calling a port every year for import, export or transshipment purposes. Be that as it may, an abnormal state of transshipment can be deluding since it's anything but a marker for network to worldwide trade, however demonstrates the nation has a transshipment center point. Estimated per capita.
Carrying capacity	The accessibility of compartments for the concerned nation, estimated in TEU. Armada arrangement is a marker of recurrence while conveying limit concerns size of shipments. Estimated per capita.
Liner companies	The measure of liner organizations that incorporate a port in this nation in their delivery lines. Additionally incorporates the quantity of boats per liner that administration the nation every year.

Liner services	The measure of organizations that offer an administration that will expand the pivot of compartments in the concerned nation.
Maximum vessel size	The greatest size of a vessel that can stack or empty products in the concerned nation, gives an understanding in economies of scale.

There is a high connection between the LSCI and the LPI. Nevertheless, nations, for example, China will score high on the LSCI because of the high measure of compartment developments, however, it falls behind on the LPI. Hoffmann (2010), the main researcher at UNCTAD and the OECD on this subject, gives various causes to this connection. The first is that a superior seen logistics performance, in this manner a higher LPI score, makes it increasingly alluring for transporters, which will prompt a higher LSCI score. This implies a higher LPI will prompt a higher LSCI. Another reason for relationship is that if a nation has a high LSCI this implies the administrations are better, which are additionally a part in the LPI and will prompt a higher LPI score. Additionally, for both indexes trade is basic, so almost certainly, despite the fact that they have some various parts, more trade will prompt a higher score on both indexes. Thinking about the present examination, it was seen that in 2016 for example, Nigeria was in 63rd place in the Liner Shipping Connectivity Index while in the World Bank LPI around the same time Nigeria was placed 90th. Ghana has an LSCI position of 65th and LPI a position of 88th in 2016 and Morocco sixteenth in LSCI and 86th in LPI in the equivalent 2016. From writing, the connection between the two indexes is spoken to as appeared in figure 6.4 below. A noteworthy impediment with LSCI is that information on trade assistance is drawn from research by private and global organizations. Most information is observation based assessments by business administrators and experts. As a result of various foundations, qualities, and characters, those studied may assess a similar circumstance in an unexpected way. Alert should along these lines be utilized when translating observation based markers.

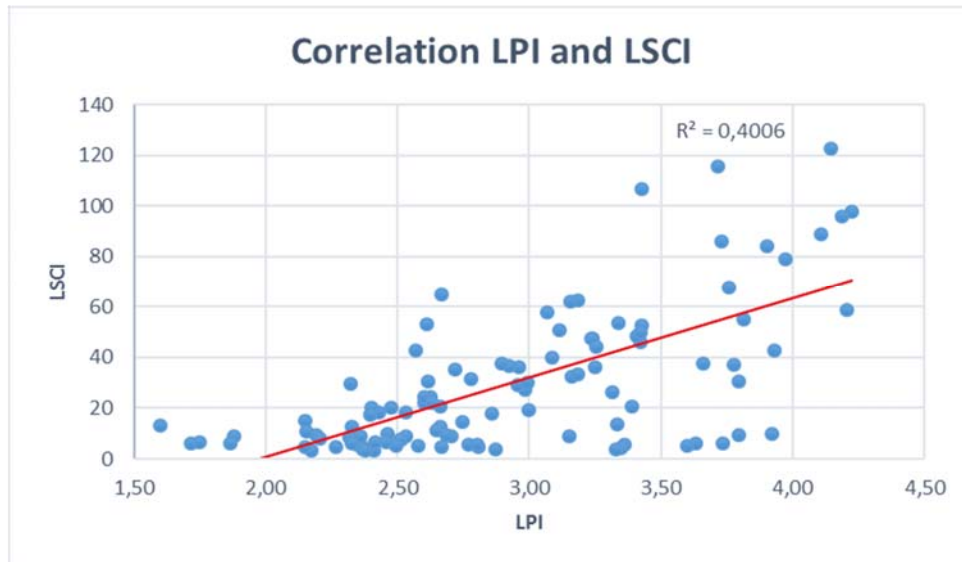


Figure x Correlation of LPI and LSCI

(Source Data: World Bank and UNCTAD)

CHAPTER SEVEN

DISCUSSION OF FINDINGS

One of the goals for this study is to enable nations to show signs of improvement understanding in their logistics performance and consequently help them take increasingly compelling measures to improve their logistics framework and performance. What can be finished up from the new positioning is that this positioning itself will not furnish nations with a superior knowledge in their logistics performance because of the high connection with the LPI positioning and the moderately small changes in positioning for practically the majority of the nations.

The LPI and the Liner Shipping Connectivity Index has likewise been considered, the point was to likewise contrast the new w-LPI index and this index. On the off chance that the w-LPI positioning would have a higher connection with these indexes than the LPI this could imply that the w-LPI would speak to calculated performance superior to the LPI. In any case, the high relationship between the LPI and the w-LPI makes it futile to contrast these indexes and measurements and the w-LPI since the outcome would be exceptionally near the outcomes discovered when the LPI was contrasted.

The discovered weights for the six center parts are altogether unique in relation to one another, implying that not every one of the segments are similarly significant when estimating logistics performance. Despite the fact that the parts are not similarly significant, clearly this does not impact the positioning enough to have a genuine effect. That the positioning does not vary much from the LPI positioning does not imply that the weights do not enlighten anything regarding the significance of various factors in logistics performance estimating.

The high relationship between the LPI and the w-LPI even with the noteworthy contrast in weights recommends that there is a connection between the scores of the various parts. A high relationship between the scores on two segments would imply that if a nation

scores high on a specific segment it will likewise score high on the other segment. On the off chance that the relationship between everything, the parts are high and this would imply that the LPI score could be anticipated by simply taking a gander at the scores on one of the segments.

This would likewise imply that relegating weights to the components will not influence the positioning much. In the event that the connection between the various parts would be low, the distinctions in positioning for a nation on every one of the segments would be higher and allotting weights will highly affect the w-LPI score and hence a higher impact on the positioning.

The high relationships between w-LPI, LPI and the segments imply that the impact of utilizing various segments is extremely low and the positioning would not vary much if just one of the parts would have been utilized.

These high connections are the purposes behind the little impacts doling out weights profoundly segments have on the general score, and in this manner the positioning. This brings up issues about the LPI and the manner in which it is determined. The parts are altogether different from one another yet in the event that the LPI speaks to strategic performance, this performance could be determined utilizing just one of them. However, the connection between the LPI scores on the segments is by all accounts too high to possibly be practical and on the off chance that they would be extremely this high, it is pointless to incorporate every one of the six segments when deciding logistics performance. What is almost certain is that the connection is brought about by how the scores on the parts are resolved. This can have a few reasons, yet the in all likelihood is that the method for addressing, or the chosen respondents cause the high relationships. At the point when results are not the same as the genuine circumstance because of the method for addressing, this is known as common technique inclination (Podsakoff, Mackenzie, Lee and Podsakoff, 2003).

Technique inclinations are a known mistake in various fields of science and can undermine the legitimacy of the dataset or the estimations. Podsakoff et al. (2003) notice that orderly estimation mistakes can give a lot of results that are exceptionally impacted by the technique for addressing and in this manner these results do not speak to the genuine circumstance just as they could. It is conceivable that strategies mistakes are available in the LPI scores, because of the respondent choice strategy (every one of the respondents work for a similar organization – Maersk).

The possibility of the LPI is that the parts consolidated should shape a general picture of logistics performance, the LPI score. It is conceivable that a few respondents rate the segments dependent on a general thought they have of a nation, for example Poor/rich. The contrast between these two techniques for deciding scores is the distinction among developmental and intelligent estimation. The LPI should be developmental, where markers decide a build (Coltman, Devinney, Midgley, and Venaik, 2008).

In the LPI the markers are the segments and the scores on these parts should decide the score of the performance, calculated performance. If a portion of the respondents would score the markers dependent in a general thought regarding a nation, the performance would decide the pointer scores. This is called intelligent estimation. On the off chance that in actuality the LPI is built dependent on an intelligent methodology by the respondents the poll ends up pointless since the respondents could simply be solicited to score the logistics performance from a nation. To discover what the methodology of the respondents is further inquired regarding the matter that is required. It could be conceivable to ask a few specialists of a specific nation and solicit them to each rate one from the segments of a nation. In the event that the scores are, at that point joined and are like the scores of the LPI, the LPI is built right. On the off chance that the scores contrast the survey of the LPI ought to be changed to come to increasingly significant outcomes. Additionally, more respondents from various nations can guarantee that all the respondent have significant data on the nations they need to score. More respondents would dispose

of the requirement for respondents to score nations that are arbitrarily doled out, and every one of the nations that must be scored by a nation could then be import or export accomplices of the nation of cause.

To expel the predisposition from the survey responses, TOPSIS was utilized to investigate the logistics performance of Ghana, Nigeria and Morocco. The outcomes demonstrated that the nation with the best logistics performance considering the six parts of LPI which include: traditions, infrastructure, administrations, practicality, following and following, and global boats is Morocco which scored 0.561, trailed by Ghana with a TOPSIS score of 0.496.

Over the span of the considerable number of examinations completed in this investigation, the theories defined for the examination were tried and the results are highlighted in table 27.

Table 27 Hypotheses Results Summary

Table 7.1: Hypotheses Results Summary	
Hypotheses	Result
H1: LPI's 6 parameters do not affect exports to the same extent	Accepted
H2: Infrastructure is more important a LPI parameter than other parameters for exports	Accepted

CHAPTER EIGHT

RECOMMENDATIONS AND CONCLUSION

In the following sections, practical and approach based proposals will be given dependent on the weights found in this investigation as opposed to on the ranking. In chapter one of this postulation, the objectives for this examination are introduced. One of these objectives was to enable the case study nations to get a better knowledge in their logistical ranking. This chapter gives short-term and long-term recommendations dependent on the results of chapter 6. More so, this chapter likewise gives suggestions on how the LPI technique could be improved, so it can operate as a device for logistics performance estimation. This chapters also gives the conclusion of this investigation. Finally, this chapter gives impediments to this investigation and proposals for future examinations.

8.1 Recommendation

The results of the past chapter demonstrate that a few elements are more significant for calculated performance than others. Nevertheless, that infrastructure and administrations have the most elevated weights does not imply that the spotlight ought to consistently be on improving these two factors and ignoring the others. Every nation requires a particular methodology, both for the present moment and for the long haul. The following areas give general proposals to the coming years (present /short term goals) and for the coming decades (long term goals).

8.1.1 Short Term Proposals

The weights obviously demonstrate that the nature of infrastructure and the ability and nature of logistics specialist co-ops are the most significant factors in logistics performance, trailed by practicality and traditions. For the momentary it is significant that measures are discovered that have intervened impact and that can be executed moderately quickly. Changes to the current infrastructure, or the usage of new infrastructure are an opportune and costly way.

In numerous nations, it will take a very long time to design another infrastructural venture

and to get the endorsement of the general population and the political help to execute the undertaking. Consequently, despite the fact that it has the most noteworthy weight, on the momentary ventures concerning huge infrastructure will not cut the best impacts.

The nature of administrations in a nation is profoundly subject to the organizations that operate them. These organizations give every one of the administrations that are expected to ship merchandise from their beginning to their goal. The administrations incorporate transportation, warehousing, pressing, and cargo sending. The way to improve the nature of administrations in a nation is attempting to get the organizations to turn out to be progressively proficient.

In this way, this area likewise gives a few proposals, in view of writing, to improve the effectiveness in the logistics administrations divisions of Nigeria, Ghana and Morocco. Sink and Langley (1997) portray the pattern that an expanding number of organizations are utilizing outsider logistics administrations. This outsider provides all the essential services to transport the completed products to their destinations. The examination gives the significant advances organizations need to take to choose the correct provider of these administrations, and how these administrations ought to be assessed continually.

For an administration it is difficult to impact the decision of an organization for the correct provider, since each organization is allowed to choose the one that is the best fit for that organization. However, Sink and Langley (1997) additionally expressed that it is significant that both the organization that is selecting the administrations supplier as the administrations supplier ought to have enough preparation in the field of logistics to go to the best coalition. The legislature can impact the instruction on logistics given by schools and colleges through endowments and advertising. Wu (2007) presumed that the requirement for instruction in logistics contrasts for created and creating countries. In the developing nations like this case studies (Nigeria, Ghana and Morocco), the requirement for instruction on moving is high yet training on transportation alone isn't sufficient and the spotlight ought to likewise be on education in by and large logistics and activities management.

For developing nations, it is conceivable that the learning to improve the logistics instruction is not accessible. For these nations (counting Morocco, Ghana and Nigeria), it very well may be helpful to discover this information in other more developed nations. A model is Costa Rica, which marked a Memorandum of Understanding (MoU) with the Netherlands. This MoU incorporated a joint effort on logistics and transportation related training, planned to improve the nature of logistics in Costa Rica and more assignment explicit instruction. Yildriz (2015) affirms the connection between the nature of logistics instruction and the logistics performance of a nation. He reasoned that there is requirement for research to investigate the immediate abilities expected to increment calculated performance. By and large, the guidance for countries is that training will influence the nature of logistics and its benefits in each nation.

Hence, countries ought to put resources into undertaking explicit instruction and preparation. The undertaking explicit preparing can have an impact on a present moment since the organizations will benefit very quickly from better prepared representatives. Improving the training on schools and colleges will presumably take longer, yet it will likewise sort a long haul impact for logistics staff later on.

For Nigeria, Ghana and Morocco, transient enhancements can be actualized in the traditional areas. This part does not have the most astounding weight, however a portion of the arrangements in this segment are simple and generally modest to execute. Likewise, Arvis et al. (2016) noticed that the traditions segment score is falling behind the other part score, making it moderately simple to stand out for a nation by improving traditional systems. Developing nations, will in general, linger behind on this factor because of the non-attendance of new advances and the bureaucratic issues in the government. Devlin and Lee (2007) noticed that in most creating nations numerous traditional organizations are dynamic and they block each other in their work. Another worry is that the objective of traditions associations in these sort of nations is to make a benefit, rather than trade assistance as is common in most western nations.

A couple of generally straightforward and modest arrangements are provided to manage

the normal traditional issues in creating nations. The principal arrangement is to expand the job of ICT in outskirt strategies (Devlin and Yee, 2007). Over the most recent couple of years, numerous systems have turned out to be accessible and that decreases the outskirt leeway time, on the off chance that they would be utilized more often the freedom procedure would turn out to be progressively sorted out and logistics performance will increase. Another plausibility for Nigeria, Ghana and Morocco is the expanded coordinated effort with neighboring nations. Presently when crossing the borderline, there are two extensive fringe procedures, both from the nation from which the truck is going as to the nation to which the truck is going. On the off chance that these nations could decrease this to one fringe procedure, in which they cooperate, this could lessen freedom times. Both of these measures can be actualized moderately quickly and will sort prompt impacts.

8.1.2 Long Term Proposals

At the point when nations need to make a procedure as long as possible, the attention ought to be on improving their infrastructure and administrations. As referenced before, making instructions that spotlights on logistics will expand the ability level of college graduates that can apply for an occupation in logistics. This will build the long term nature of administrations. Numerous activities concerning infrastructure are presented and executed in practically all nations. How well they influence the calculated performance is difficult to assess and that makes it harder to offer a guidance dependent on the results in this examination.

Infrastructure measures could be hard or delicate infrastructure. Hard infrastructure is unmistakable infrastructure, for example, streets, rails and port structures. ICT infrastructure is likewise considered to be hard infrastructure. The delicate infrastructure comprises of conventions, business environment, and other institutional impalpable angles (Portugal-Perez and Wilson, 2012). Portugal-Perez and Wilson (2012) tried the impacts of measures in four unique parts of infrastructure on the all-out export of the nation. Two

of these were markers for hard infrastructure: ICT and physical infrastructure and two of them were delicate infrastructure pointers: business environment and transport effectiveness.

They discovered that for creating nations the improvement of the physical infrastructure arranged the most impact. This physical infrastructure comprises of streets, rails, ports and landing strips in their exploration. They also found that the lower the salary of a country, the lower the effect of vehicle proficiency and the business environment. Other than this relation, they likewise discovered that the higher the salary of a nation, the higher the negligible effect of enhancements in ICT structure and physical infrastructure. The main worry with this outcome is that it is generally costly to actualize enormous infrastructure ventures and there is significant money related dangers.

8.1.3 LPI technique guidance

Other than the advices for policy creators in Nigeria, Ghana and Morocco, the weights and the positioning reflected some errors in the LPI. This piece of the work will comprise of a short exhortation on the most proficient method to improve the LPI technique. As referenced before common strategy inclination represents an issue with the LPI. Almost certainly, the method for addressing impacts the results and subsequently the positioning. The moderately low number of respondents (10 respondents), and the random manner in which the respondents judged the explicit segments leads to one-sided results. It prompts high relationships between the parts and a high connection between every one of the segments and the LPI score. In addition, it is the reason that the LPI and the w-LPI positioning are practically indistinguishable. To improve the LPI it is encouraged to utilize the weights found in this research, since they are fundamentally unique in relation to the weights when every one of the segments are considered similarly significant. Other than this, the method for addressing ought to be changed.

On the off chance that the quantity of respondents is expanded, respondents could be asked to just score the nations on which they have adequate data on every one of the segments.

This guarantees that the LPI score depends on scores on the parts, rather than dependent on a general thought a respondent has of a nation. To test the ebb and flow LPI, increasingly future examination into a few nations should be possible, where the expert from one nation is approached to rate their own nation to check whether the scores are near the scores discovered utilizing the LPI survey. In the event that they are extraordinary, this recommends the poll of the LPI ought to be changed.

Other than the poll of the LPI, the parts ought to be likewise be investigated. The expert's reactions propose that at any rate two factors in logistics performance have been forgotten. The main factor is advancement, which importantly affects the nation's potential outcomes to receive new advances and adjust to changing the strategic frameworks. The second, and likely most significant factor is environment. The environmental change has brought the environment into the political motivation and transport and logistics are a significant factor in the environmental change, for the most part because of the outflow of CO₂ and little particles. The World Bank could survey which components ought to be included or left out before another report is delivered. The technique for weight task that has been proposed in this examination could be utilized to decide the weights of the parts.

8.1.4 Suggestions on weights

Administrations and infrastructure are the two parts that can be affected from multiple points of view. Numerous variables have effect on the all-out infrastructure framework and how these framework capacities work. For every nation it differs what the best measures are to increase the proficiency of the infrastructure, because each country has different weaknesses and systems that are lagging behind. The equivalent goes for the nature of administrations as they are performed mostly by the private sectors. This sector can be local organizations or huge multinationals playing out these administrations worldwide. Step-by-step instructions to impact these administrations will vary per nation and will be founded on what organization they manage. A potential outcome for nations to figure out which measures ought to be actualized, is a cost-benefit analysis. In this analysis, a few estimates can be incorporated to test which one will have the most noteworthy advantages in the long term. The proposed measures in this chapter, for example, center on the associations and understandings between neighbouring nations, ICT in outskirts methodology and put resources into the hard infrastructure are accordingly a few recommendations that could be considered for future research.

8.2 Conclusion

Research on an existing body of knowledge demonstrated that for every one of the six parts of the LPI: customs, infrastructure, administrations, practicality, following and following, and worldwide shipment writing was accessible on the impacts of the segment on trade. This demonstrates that each of the six of the parts are in fact factors in strategic performance. However, the general significance of each one of these variables is not portrayed in writing.

Other than the segments, two different components that decide logistics performance were recommended by a portion of the respondents, which are not at present incorporated into the LPI: Innovation and Environment.

The Liner Shipping Connectivity Index (LSCI) was compared with the Logistics Performance Index (LPI) and it was discovered that the LSCI has a connection of 0.40 with the LPI. There is a need to compare the score of the w-LPI with the liner shipper connectivity index to check if the connection would be higher which could show that the w-LPI was increasingly precise. However, comparing these indexes and the w-LPI was discovered futile because of the high correlation between the LPI score and the w-LPI score.

Allocating weights to the criteria (parts) turned the analysis to a Multi Criteria Decision Making (MCDM) issue, which was comprehended with TOPSIS. The TOPSIS had the option to comparatively evaluate the LPIs of Nigeria, Ghana and Morocco and the result demonstrated that:

To discover the weights of the various segments, specialists were requested to fill out a questionnaire. The most significant part was observed to be Infrastructure and the least significant segment is Tracking and tracing.

These weights demonstrated to be essentially unique in relation to the weights accepted by the LPI reports where every one of the parts was considered similarly significant. In this manner, the aggregate of respondents was utilized for further investigation.

The created weighted-LPI (w-LPI) demonstrated to have a high connection with the LPI. The w-LPI and LPI scores have a connection of 1 with one another.

This similitude between the LPI and the w-LPI suggests that despite the fact that the weights are fundamentally unique, this does not impact the positioning. This shows if a nation scores high on one of the parts, it is in all respects prone to score high on the other segment. The relationships between the parts were verified to be high (somewhere in the range of 0.93 and 1). Because of these high correlations, the weight task does not sort the impact it was relied upon to do. A conceivable clarification for the high connection is the common technique bias. Common technique bias shows that the results are profoundly

impacted by the method of questioning. Respondents are solicited to rate the three nations from explicit parts of which it is impossible that they have enough knowledge. In this way, almost certainly, they judge the parts dependent on a general thought they have of a nation.

The research provided weights to the various parts of the LPI which could support African nations (Ghana, Nigeria and Morocco) by centering their projects on the variables that impact logistical performance the most. For the present moment, these nations ought not to concentrate on infrastructure since executing new infrastructures or adjusting current infrastructures is an auspicious and exorbitant procedure. The nature of logistics specialist organizations can anyway be enhanced in a short-term by encouraging specially designed on-the-job training. For the long-term infrastructure, investments ought to improve logistics performance. Studies found that investments in physical infrastructure are the best for developing nations and investments in networks are prompted for developed nations.

This investigation demonstrates that the LPI can be improved by allocating weights to the segments. The weights found in this examination are altogether not quite the same as the weights found when every segment is considered similarly significant. This ostensibly could comprise that the first run through weights have been appointed to factors in the logistics performance and accordingly these weights can give supportive bits of knowledge to African nations on the best way to execute new projects. Additionally, these weights can be the beginning stage for future research into logistics performance estimation utilizing weight assignments for various factors in logistics.

8.3 Practical Implications of the Study

This examination demonstrates that the LPI can be improved by allocating weights to the segments. The weights found in this examination are altogether unique in relation to the weights found when each component is considered similarly significant. This ostensibly could comprise the first run through weights have been appointed to factors in the logistics performance, and thus these weights can give supportive bits of knowledge to African nations on the most proficient method to actualize new projects. Additionally, these weights can be the beginning stage for future investigations into logistics performance estimation utilizing weight assignment for various factors in logistics.

Toward the beginning of this research, it was expected that the weights of the six core components would be essentially unique, since it appeared to be exceptionally far-fetched that every one of these elements were similarly important in logistics performance estimating. This additionally prompted the believe that applying these weights to the part would prompt a distinction in positioning, in view of which nations would then be furnished with a better understanding in their position concerning logistics.

This better understanding, joined with the recently discovered weights, could then enable nations to figure out where new logistics tasks ought to be engaged and what is most significant for their nation to improve. When executing the examination, weights were discovered that vary, essentially from the weights utilized for the LPI. This may be one of the main occasions weights have been allocated to the segments of the LPI, and apparently the first run through this strategy has been utilized in the logistics and transportation division.

The weights will enable African nations to show signs of improvement understanding in the significant factors in strategic performance and in this manner help them concentrate new logistics tasks or change existing ones. The contextual analysis nations are most likely not furnished with a superior knowledge in their universal position, since the w-LPI positioning does not vary much from the LPI positioning.

8.4 Limitation of the Research

A constraint to the research is the respondents, as it seemed difficult getting the right respondents living in the three nations. The expert respondents were chosen dependent on their expert profiles. The respondents all work for one international shipping company (Maersk) as well as selected port authorities in the three countries and have experience in the field. Nevertheless, it is not hundred percent sure that they all have the information expected to address the inquiries. The trouble of obtaining the essential information was a noteworthy impediment to the investigation.

8.5 Suggestions for Further Studies

This research recognizes a few requirements for further examination, concerning further examination into logistics performance estimating just as investigation into the LPI methodology. The principal suggestion is an examination on the components that decide logistics performance. Specialists propose that the six components of the LPI are by all account not the only factors of significance with respect to logistics performance. An investigation into these variables can build the unwavering quality of the LPI and guarantees its outcomes are fully informed regarding the patterns and advancements in logistics.

More research is likewise required concerning the ramifications of the weights that are found in this investigation. These weights demonstrate to be essentially unique for one another and have impacts on the calculated performance. In any case, these weights still must be changed into genuine strategy measures to improve the logistics performance of African nations. So to do as such, further research is required into various activities that influence the scores, and these weights have to figure out what tasks are the most productive to put resources into a nation.

It is additionally encouraged to further research and change the LPI approach. In the event that the quantity of respondents is increased, respondents can be asked to just score the

nations on which they have adequate data on every one of the parts. This will guarantee that the LPI score depends on scores on the parts, rather dependent on a general thought a respondent has on a nation. To confirm this w-LPI, an examination into a few other African nations should be possible, where the expert from one nation is approached to rate their very own nation to check whether the scores are near the scores discovered utilizing the LPI questionnaire. In the event that they are extraordinary, this recommends the questionnaire of the LPI ought to be changed. Other than the survey of the LPI, the components ought to likewise be re-assessed. Specialists recommend that in any event two factors in the logistics performance have been omitted. The principal factor is 'innovation' and the subsequent factor is 'environment'. The World Bank could re-assess which variables ought to be included, or left out, before another report is created. The strategy for weight assignment that has been proposed in this research could be utilized to determine the weights of the components if their arrangement changes.

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APPENDICES

Appendix A: Questionnaire & Cover Letter

This appendix shows the body of cover letter that was included in the e-mail to the approached experts at Maersk. It also contains the questionnaires that were sent to the experts.

Cover Letter

Dear Respondent,

I am currently conducting this research for my thesis for my MSc. program. The aim of this research work is to analyse, evaluate and improve the Logistics Performance Index of the selected Countries' Economy. The countries selected as case studies for this research work are Nigeria, Ghana and Morocco. I kindly ask you to fill in the following questionnaire as it will be of great help in my research. Please note that Section C to Section H of the questionnaire should be filled separately for each of the three countries (Nigeria, Ghana and Morocco). If you have any questions, please feel free to email me.

Thanks.

Questionnaire

SECTION A: PERSONAL DETAILS OF RESPONDENT

(Kindly fill in the appropriate answers in the spaces below)

1. In which country are you living? _____
2. What is your Nationality? _____
3. Which country do you/your company operate from? _____
4. What is your position in your company? _____
5. What transport mode do you/your company use to deliver freight?

6. What is your direction of trade (exports/imports/domestics)?

The following questions concern the six core components of the LPI. The World Bank describes the six components as:

Customs - The effectiveness of customs and border administration.

Infrastructure - The efficiency of logistics infrastructure.

Quality of services - The capacity and efficiency of logistics services - clearing, forwarding, and customs services.

Timeliness – How fast shipments gets to consignees and whether it gets there within the time delivery scope.

Tracking & Tracing - The ability to monitor goods.

Ease of arranging shipments - The ease of facilitating competitively priced items.

Though, these factors may not be of equal significance for logistics performance and may not necessarily be the only components worth considering or paying attention to. Sequel to this, please I need you to suggest any other components worth adding to these existing six components, and then assign weights to these factors to give a better representation of logistics performance.

SECTION B - Description: Choose a number between 1 and 5 to indicate the weight/importance of each criterion. Selecting a 1 means that the criterion is not too important and selecting a 5 means the criteria is extremely important with respect to Logistics Performance. Please select by ticking with (x).

CRITERIA	1	2	3	4	5
Customs					
Infrastructure					
Services					

Tracking & Tracing					
Timeliness					
International shipments					

SECTION C: THE EFFICIENCY OF CUSTOM AND BORDER MANAGEMENT CLEARANCE

(Kindly tick (x) the appropriate answers in the boxes below)

7.	8.	9.	YES	10.	NO	11.	UNDEC IDED
12.	13. Is the Customs clearance procedure transparent?	14.		15.		16.	
17.	18. Is the clearance procedure of borders transparent?	19.		20.		21.	
22.	23. Is the clearance process by border control agencies and customs efficient?	24.		25.		26.	
27.	28. Has Customs clearance procedures improved over the years?	29.		30.		31.	
32.	33. Has Customs clearance procedures worsened over the years?	34.		35.		36.	
37.	38. Do you receive adequate and timely information when regulations change?	39.		40.		41.	
42.	43. Do traders who demonstrate high levels of compliance receive expedited clearance?	44.		45.		46.	
47.	48. Are other border-related government agencies clearance procedures trade friendly?	49.		50.		51.	
52.	53. Can customs declarations be submitted and processed electronically and online?	54.		55.		56.	
57.	58. Does Customs code require	59.		60.		61.	

0	importers to use a licensed Customs Broker to clear goods?			
62.1	63. Are you or your customer able to choose the location of the final clearance of the goods for imports?	64.	65.	66.
67.2	68. Are goods released pending final clearance against an accepted guarantee?	69.	70.	71.
72.3	73. Are there standard methods of inspecting import shipments?	74.	75.	76.

SECTION D: THE QUALITY OF TRADE AND TRANSPORT INFRASTRUCTURE
(Kindly tick (x) the appropriate answers in the boxes below)

77.	78.	79. V ERY HIGH	80. H IGH	81. A VERAG E	82. OW	83. V ERY LOW
84.	85. Rate the quality of the available road transport infrastructure	86.	87.	88.	89.	90.
91.	92. Rate the quality of airport infrastructure	93.	94.	95.	96.	97.
98.	99. Assess the quality of rail transport infrastructure	100.	101.	102.	103.	104.
105.	106. Assess the quality of port infrastructure	107.	108.	109.	110.	111.
112.	113. Evaluate the quality of the available warehousing facilities	114.	115.	116.	117.	118.
119.	120. Assess the quality of telecommunications infrastructure	121.	122.	123.	124.	125.
126.	127. How often are you unable to deliver goods as scheduled based on poor transport infrastructure?	128.	129.	130.	131.	132.
133.	134. Assess the interest of Government in investment of trade and transport infrastructure	135.	136.	137.	138.	139.

140.	141. What effect does availability of transport infrastructure have on the cost of transporting goods?	142.	143.	144.	145.	146.
147.0	148. Evaluate the operational cost of transporting goods by road transport infrastructure	149.	150.	151.	152.	153.
154.1	155. Evaluate the operational cost of transporting goods by rail transport infrastructure	156.	157.	158.	159.	160.
161.2	162. Evaluate the operational cost of transporting goods by ports/sea transport infrastructure	163.	164.	165.	166.	167.
168.3	169. Evaluate the operational cost of transporting goods by air transport infrastructure	170.	171.	172.	173.	174.

SECTION E: THE COMPETENCE AND QUALITY OF LOGISTICS SERVICES

(Kindly tick (x) the appropriate answers in the boxes below)

175.	176.	177. V ERY HIGH	178. H IGH	179. A VERAG E	180. OW	181. V ERY LOW
182.	183. Assess the competence and quality of logistics services rendered by Maritime transport service providers	184.	185.	186.	187.	188.
189.	190. Assess the competence and quality of logistics services rendered by Air Transport Service Providers	191.	192.	193.	194.	195.
196.	197. Assess the competence and quality of logistics services rendered by Road Transport Service Providers	198.	199.	200.	201.	202.
203.	204. Assess the competence and quality of logistics services rendered by Rail Transport Service Providers	205.	206.	207.	208.	209.
210.	211. Assess the competence and quality of	212.	213.	214.	215.	216.

	logistics services rendered by Warehousing and Distribution Operators					
217.	218. Assess the competence and quality of logistics services rendered by Custom Agencies	219.	220.	221.	222.	223.
224.	225. Assess the competence and quality of logistics services rendered by Quality/Standard Inspection Agencies	226.	227.	228.	229.	230.
231.	232. Assess the competence and quality of logistics services rendered by Health/Sanitary Agencies	233.	234.	235.	236.	237.
238.	239. Assess the competence and quality of logistics services rendered by Trade and Transport related Associations	240.	241.	242.	243.	244.
245. 0	246. Assess the competence and quality of logistics services rendered by the Consignees or Shippers	247.	248.	249.	250.	251.
252. 1	253. Assess the competence and quality of logistics services rendered by the Freight Forwarders	254.	255.	256.	257.	258.
259. 2	260. How often do you experience major delays due to compulsory warehousing?	261.	262.	263.	264.	265.
266. 3	267. How often do you experience major delays due to pre-shipment inspection?	268.	269.	270.	271.	272.
273. 4	274. How often do you experience major delays due to maritime transshipment?	275.	276.	277.	278.	279.
280. 6	281. How often do you engage in informal payments in connection with logistics activities?	282.	283.	284.	285.	286.
287. 7	288. How often do you experience cyber security threats in logistics	289.	290.	291.	292.	293.

SECTION F: THE FREQUENCY WITH WHICH SHIPMENTS REACH CONSIGNEES
(Kindly tick (x) the appropriate answers in the boxes below)

294.	295.	296. YES	297. NO	298. UNDEC IDED
299.	300. Are import shipments cleared and delivered as scheduled?	301.	302.	303.
304.	305. Are export shipments cleared and shipped as scheduled?	306.	307.	308.
309.	310. The production of certain items or processing plant determines delivery timeliness	311.	312.	313.
314.	315. Political risks and environmental weather conditions sometimes determine shipment times	316.	317.	318.
319.	320. Quality of logistics services rendered can sometimes cause delay in delivering shipments	321.	322.	323.
324.	325. The distance between customers and suppliers determine when shipments reach consignees	326.	327.	328.
329.	330. Quality of trade and transport infrastructures available in the country determine shipment times	331.	332.	333.
334.	335. Availability or unavailability of storage equipment such as containers sometimes determine delivery times	336.	337.	338.
339.	340. Delay sometimes arise from criminal activities such as missing or stolen shipments	341.	342.	343.

SECTION G: THE ABILITY TO TRACK AND TRACE CONSIGNMENTS
(Kindly tick (x) the appropriate answers in the boxes below)

344.	345.	346. YES	347. NO	348. UNDEC IDED
349.	350. Are technologies available to trace and track products along the chain in your country?	351.	352.	353.
354.	355. Are these technologies precise and reliable with no manual intervention in tracking	356.	357.	358.

	consignments?			
359.	360. Are information collected at each point of the supply chain communicated effectively to the actors (i.e. suppliers and customers)?	361.	362.	363.
364.	365. Are these technologies easily affordable and accessible in your country of operation?	366.	367.	368.
369.	370. Does the available tracking technologies provide 100 percent traceability of consignments?	371.	372.	373.
374.	375. Are there continuous efforts to advance traceability by government and trade and industry associations in your country?	376.	377.	378.
379.	380. Are the informations gotten from tracking consignments used effectively in preventing or managing risks?	381.	382.	383.

SECTION H: GOVERNANCE/GOVERNMENT INDICACATORS
(Kindly tick (x) the appropriate answers in the boxes below)

384.	385.	386. V ERY HIGH	387. H IGH	388. A VERAG E	389. OW	390. V ERY LOW
391.	392. Assess the rate of voice and accountability by the national government towards trade logistics	393.	394.	395.	396.	397.
398.	399. Evaluate the effect of political stability and absence of violence or terrorism on trading in your country	400.	401.	402.	403.	404.
405.	406. How effectively does government respond and work towards minimizing the challenges inhibiting the performance of the logistics sector ?	407.	408.	409.	410.	411.
412.	413. To what degree does the rule of law and regulations favour logistics activities in your country?	414.	415.	416.	417.	418.
419.	420. To what extent does corrupt practices by different government officials hinder or	421.	422.	423.	424.	425.

	affect logistics performance in your country?					
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Please which other components other than these six (CUSTOM, INFRASTRUCTURE, QUALITY OF SERVICES, TIMELINESS, TRACKING & TRACING, and EASE OF ARRANGING SHIPMENTS) is worth considering for logistics performance of a country.